## PUBLIC WORKS

Nov. 1950

CITY, COUNTY AND STATE

Steel Required for Sewage Treatment Plants

Asymmetrical Street
Crown Design

Design Data for Sanitary Fill Installations

Model Water Filter Plant for Chapel Hill

How to Paint Steel Bridges

New Engineering Projects
Reported by Engineers



leasers in the Public Works Picid: Samuel S. Baxter, in charge of Philissciphio's Bureau of Engineering & Surveys. Here data on Page 20.

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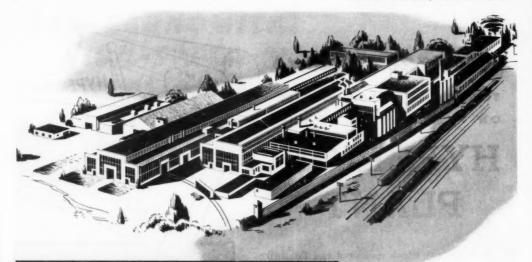


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## PUBLIC WORKS

## Magazine

Edited by W. A. Hardenbergh and A. Prescott Folwell

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#### CONTENTS

#### NOVEMBER, 1950

0

Steel Required for Sewage Treatment Plants 35 Prestressed Concrete Pipe Saves Steel 36 Relaying Oil-Mix Surfaces Mechanically 37 A Model Filtration Plant for a Problem Town. By J. L. Morrison 38 Lansing Rents Garbage Cans. By Ronald J. Cooke 40 Snow Removal Costs Cut in Half. By Robert Deardorff 41 Designing, Locating and Operating Sanitary Fills 42 Graphical Design of Asymmetric Street Crowns. By David Weage 44 Factors in Vacuum Filtration of Sludge. By T. R. Komline 48 Small Water Treatment Plant 49 Step by Step Procedures in Low Cost Bituminous Surfaces. By E. R. Hanna 50 New Engineering Projects Reported by Consulting Engineers 52  PUBLIC WORKS DIGESTS The Water Works Digest 66 The Highway and Airport Digest 66 The Sewerage and Refuse Digest 70  PUBLIC WORKS ENGINEERING DATA The Manhole That Wasn't There 40 Copper Sulfate for Root Control in Cincinnati 56 DDT Prevents Termites from Attacking Wood Work 56 Public Works Costs Lower in Milwaukee. By John Hubel 59 Recommendations for Disaster Planning 60 Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root 64 Chlorinating Water Mains 65 Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 70  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 18 The Engineers' Library 85 Worth Telling, By Arthur K. Akers 90	How to Paint a Bridge. By H. C. Jester .	***************************************	31
Relaying Oil-Mix Surfaces Mechanically	Steel Required for Sewage Treatment	Plants	35
A Model Filtration Plant for a Problem Town. By J. L. Morrison	Prestressed Concrete Pipe Saves Steel	***************************************	36
A Model Filtration Plant for a Problem Town. By J. L. Morrison	Relaying Oil-Mix Surfaces Mechanicall	y	37
Snow Removal Costs Cut in Half. By Robert Deardorff			38
Snow Removal Costs Cut in Half. By Robert Deardorff	Lansing Rents Garbage Cans. By Ronal	ld J. Cooke	40
Designing, Locating and Operating Sanitary Fills			41
Graphical Design of Asymmetric Street Crowns. By David Weage	Designing, Locating and Operating Sc	anitary Fills	42
Small Water Treatment Plant			44
Step by Step Procedures in Low Cost Bituminous Surfaces.  By E. R. Hanna 50 New Engineering Projects Reported by Consulting Engineers 52  PUBLIC WORKS DIGESTS The Water Works Digest 61 The Highway and Airport Digest 66 The Sewerage and Refuse Digest 70  PUBLIC WORKS ENGINEERING DATA The Manhole That Wasn't There 40 Copper Sulfate for Root Control in Cincinnati 56 DDT Prevents Termites from Attacking Wood Work 56 Public Works Costs Lower in Milwaukee. By John Hubel 59 Recommendations for Disaster Planning 60 Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root 64 Chlorinating Water Mains 65 Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 75			48
By E. R. Hanna 50  New Engineering Projects Reported by Consulting Engineers	Small Water Treatment Plant		49
PUBLIC WORKS DIGESTS The Water Works Digest 61 The Highway and Airport Digest 66 The Sewerage and Refuse Digest 70  PUBLIC WORKS ENGINEERING DATA The Manhole That Wasn't There 40 Copper Sulfate for Root Control in Cincinnati 56 DDT Prevents Termites from Attacking Wood Work 56 Public Works Costs Lower in Milwaukee. By John Hubel 59 Recommendations for Disaster Planning 60 Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root 64 Chlorinating Water Mains 65 Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 7 Leaders in Public Works 55	Step by Step Procedures in Low Cost		
The Water Works Digest			50
The Water Works Digest         61           The Highway and Airport Digest         66           The Sewerage and Refuse Digest         70           PUBLIC WORKS ENGINEERING DATA           The Manhole That Wasn't There         40           Copper Sulfate for Root Control in Cincinnati         56           DDT Prevents Termites from Attacking Wood Work         56           Public Works Costs Lower in Milwaukee. By John Hubel         59           Recommendations for Disaster Planning         60           Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root         64           Chlorinating Water Mains         65           Research on Sulfur Compound Joint Materials         68           Dual Fuel Engines for Sewage Treatment Plant         68           Sanitary Fill in Cold Areas         69           Special Trailers Help in Highway Work         69           Restricting Discharges Into Sewers         76           DEPARTMENTS AND SECTIONS           The Editor's Page         7         Leaders in Public Works         20           Letters to the Editor         18         Public Works Equipment         79           Books in Brief         18         The Engineers' Library         85	New Engineering Projects Reported by	Consulting Engineers	52
The Highway and Airport Digest		PUBLIC WORKS DIGES	TS
The Highway and Airport Digest	The Water Works Digest		61
PUBLIC WORKS ENGINEERING DATA	the state of the s		
PUBLIC WORKS ENGINEERING DATA The Manhole That Wasn't There			
The Manhole That Wasn't There	The second secon		
Copper Sulfate for Root Control in Cincinnati	PUBLIC	WORKS ENGINEERING DA	FA
DDT Prevents Termites from Attacking Wood Work 56 Public Works Costs Lower in Milwaukee. By John Hubel 59 Recommendations for Disaster Planning 60 Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root 64 Chlorinating Water Mains 65 Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 84 Add Activities 85	The Manhole That Wasn't There	***************************************	40
Public Works Costs Lower in Milwaukee. By John Hubel 59 Recommendations for Disaster Planning 60 Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Roof 64 Chlorinating Water Mains 65 Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 84 Add Action 18 The Engineers' Library 85	Copper Sulfate for Root Control in Ci	incinnati	56
Recommendations for Disaster Planning			56
Plant Provides Hot Asphalt Mix in a Hurry. By L. F. Root			59
Chlorinating Water Mains	Recommendations for Disaster Plannin	ng	60
Research on Sulfur Compound Joint Materials 68 Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 18 The Engineers' Library 85	Plant Provides Hot Asphalt Mix in a H	urry. By L. F. Root	64
Dual Fuel Engines for Sewage Treatment Plant 68 Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 18 The Engineers' Library 85	Chlorinating Water Mains		65
Sanitary Fill in Cold Areas 69 Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 18 The Engineers' Library 85	Research on Sulfur Compound Joint A	Materials	68
Special Trailers Help in Highway Work 69 Restricting Discharges Into Sewers 76  DEPARTMENTS AND SECTIONS The Editor's Page 7 Leaders in Public Works 20 Letters to the Editor 18 Public Works Equipment 79 Books in Brief 18 The Engineers' Library 85	<b>Dual Fuel Engines for Sewage Treatme</b>	ent Plant	68
Restricting Discharges Into Sewers	Sanitary Fill in Cold Areas		
The Editor's Page	Special Trailers Help in Highway Work		69
The Editor's Page	Restricting Discharges Into Sewers	***************************************	76
Letters to the Editor		DEPARTMENTS AND SECTIO	NS
Letters to the Editor	The Editor's Page	Leaders in Public Works	20
Books in Brief			
West Tillian B. Auf. M. Al.			
	Mark Tallian D. A.d. W. Al	,	90

THE ENGINEERING AUTHORITY IN THE CITY-COUNTY FIELD

## Nashville Housing Authority Records Prove Economy of the Dempster-Dumpster System

#### A Message To All Cost Minded Municipalities, Housing Authorities—

"The Dempster-Dumpster System has fulfilled our requirements better than any other system of trash collection," the Nashville Housing Authority recently reported to the manufacturers, Dempster Brothers, Inc.

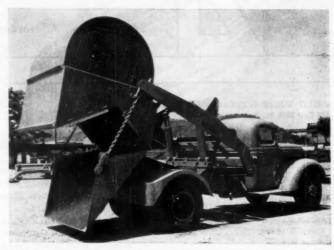
The Nashville Housing Authority is just one of the hundreds of users of the Dempster-Dumpster System who have cut their collection costs (oftentimes in half) and increased collection efficiency tremendously, after installing the Dempster-Dumpster System of bulk trash and rubbish collection.

#### Operated By One Man

The Dempster-Dumpster System is, simply stated, one or more truck-mounted Dempster-Dumpsters, with one man, the driver, to each unit, servicing any number of detachable Dempster-Dumpster containers ranging in size up to 12 cu, yds. The Dempster-Dumpster makes scheduled calls at housing, market and business areas, hospitals, schools, etc., and picks up a preloaded container, hauls it to disposal area where contents are dumped automatically, then returns container to replace another pre-loaded container.

This single truck-mounted Dempster-Dumpster services any number of containers, one after another. Each of the containers in the NHA's housing areas handle the refuse accumulated by 33 families, and are emptied twice a week by one of the City of Nashville's Dempster-Dumpsters.

The sanitation and cleanliness of the Dempster-Dumpster System are due to the completely closed steel containers. Trash and refuse cannot be scattered over streets and alleys by winds or scavengers in the fire-proof and rat-proof Dempster-Dumpster containers.



HERE'S A 10 CU. YD. APARIMENT TYPE container shown in dumping position. Its payload capacity is greater than the average conventional truck body. Container is placed in dumping position and drap-hottom section of container is lowered for dumping . . . all under complete control of driver in cab. This is the type container that handles the refuse accumulated by 33 families in a Nashville housing area.

#### System Grows as Needed

The City of Birmingham started out with 10 containers and one Dempster-Dumpster in 1938. Now Birmingham has 12 Dempster-Dumpsters servicing 204 containers. Richmond, Va. started out with 14 containers and two Dempster Dumpsters in 1946. Today Richmond has six Dempster-Dumpsters servicing 288 containers. And so on down the line in city after city where the Dempster-Dumpster System is cleaning up business areas, school and housing areasetc., and saving taxpayers thousands of dollars annually.

For example, when Richmond replaced the conventional open truck method of bulk rubbish collection in the business area with the Dempster-Dumpster System, it cut collection costs from \$1.03 to .43 a cubic yard. The pay-load capacity of the larger Dempster-Dumpster Containers is equal to or greater than conventional truck bodies. It is important to remember that containers are available in many different designs of every desired size. For instance, where it is desirable to have a water-tight container for moist or wet rubbish, a Tilt Type container is used. And, bear in mind, regardless of the design or size of the containers you have spotted at your congested business areas, schools, apartments, etc., one truck-mounted Dempster-Dumpster can service all containers.

The Dempster-Dumpster System triples man-hour efficiency . . reduces truck investment, gas, oil, maintenance costs . . . improves "housekeeping" methods . . reduces fire hazards . . . provides an easier, quicker, safer and more effective manner of handling trash and refuse.

If you have a bulk refuse handling problem, check up, by all means, on the Dempster-Dumpster System! Write today to Dempster Brothers, Inc. for complete information,





PICK-UP AND HAULING OPERATIONS are shown in the two photos above. Driver backs Dempster-Dumpster Unit up to loaded container, slips lifting chains onto lugs at each end of container, then, by hydraulic controls in the cab, lifts container into carrying position and drives to disposal orea.

DEMPSTER BROTHERS

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#### **Better Construction at Sewage Treatment Plants**

M OST everyone familiar with sewage treatment plants knows that such installations furnish very severe testing grounds for concrete. Only the best of this—and of other—material can stand up under the conditions that exist. For this reason, engineers should be especially interested in such recent developments as air-entrained concrete and the greater use of vitrified tile.

Air-entrained concrete has been found particularly resistant to freezing and thawing, and to the scaling action that so often results when sodium or calcium salts are applied to ice-covered streets as a safety measure. No data seem to be available to determine if it will also resist the corrosive action that so often takes place in sewage treatment plant structures.

In a treatment plant now being built, your editor is using vitrified tile for the filter walls instead of concrete. On this particular job, the filters are wholly above ground. They are not designed for flooding. The walls are being built of silo-type vitrified blocks, with imbedded reinforcing. The cost appears likely to be slightly less; it is anticipated that the appearance will be pleasing; and the record of vitrified clay for long life should be sufficient to assure freedom from worry in that respect.

The editor will greatly appreciate information from any reader regarding the use of air-entrained concrete for sewage treatment plants. From its record in other fields, it ought to prove a valuable addition to our list of construction materials.

#### For Better Utilization of Engineers

P RONOUNCEMENTS of the National Security Resources Board, and especially of the Defense Department, regarding the use of professional skills have the familiar ring of 1942, as though some harried and hurried line officer had turned back to the reports of those days and, knowing nothing about the matter, had paraphrased what was then official policy. Remembering that those policies resulted in no more than 50% utilization of engineering skills, there is reason for a slight shiver of apprehension.

If any greater emergency should arise, there

should be no delay in taking immediate steps to conserve all of the engineering skills that this country has. We have not added materially to the number of experienced engineers during the past seven or eight years, and we cannot afford to waste their skills as prodigally as we did in the past. We believe it will be necessary to classify engineers as a critical category of skill and to allocate them to military, civilian and industrial uses on the basis of overall needs. This will mean that engineers must be used only where engineering skills are essential, and not as infantry platoon commanders, sanitary inspectors, or noncommissioned personnel; nor in any other of the many useless places they were pushed into in the past.

The mechanics of placing engineers in such a category, and of allocating their services thereafter may appear complicated, but are entirely workable. It was done during World War II with at least one sizable group of engineers, and with certain whole professions. We earnestly recommend to the organized engineering profession that it consider this matter now.

The basic trouble, of course, in Defense Department policy is that the line of the Army does not and cannot understand that more and better engineering and construction work can be done with fewer men if these men are properly trained for the work. It is a matter of knowledge, if not of official record, that this was the case with those Corps of Engineer organizations in World War II which were headed by trained engineers, and had trained engineers in the key positions. We hope our readers will tell their Congressmen and Senators how they feel about this important matter.

#### In Six Months An Engineer?

P RESENT regulations, which may or may not apply to engineers, permit deferment for six months while a replacement is being trained. Where specific training is not needed, the 6-month requirement is probably all right though it will certainly not work in categories of skills that are short in supply. More important, what happens to the engineer who is displaced? Is provision to be made so that his professional skills will be used, or will he be lost in the shuffle? It is time the engineering profession took a bolder stand on such matters.

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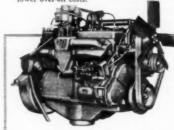
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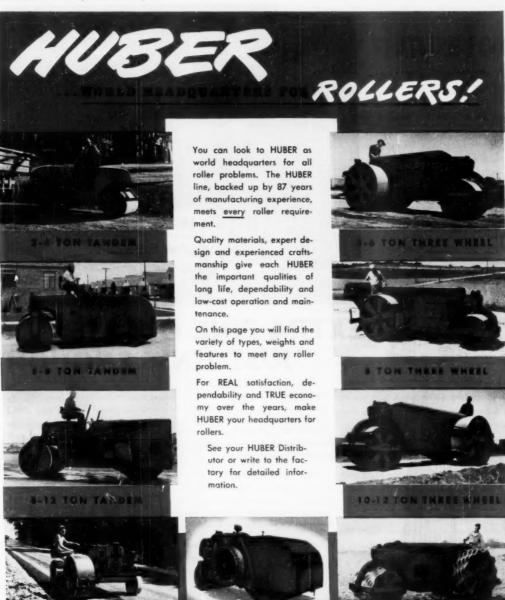
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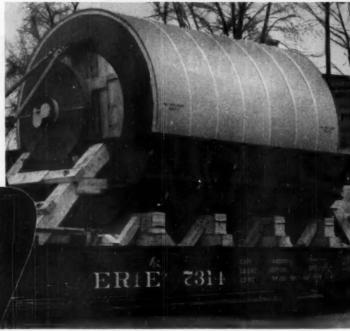
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## Sanitary District of Chicago selects Conkey Sludge Filters for world's largest sewage sludge dewatering installation

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Typical of those features are plastic backing plates for filter cloth support, Uscolite pipe lines and drainage bells, a double scraper arrangement, specially formulated protective coatings and newly developed components made of special plastics.

The same high order of creative filter engineering that filled this milliondollar order for the Sanitary District of Chicago and many another customer, will "do it better" for you. An invitation: write for Bulletin No. 100 that more fully describes Conkey Sludge Filters.

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The "W" on the tube and the CIRCLES on the carton identify **quality** 

In choosing copper tubing, you can be sure of top quality if you see a "W" on the tube which comes to you individually packed in a strong carton having an all-over design of circles against a blue background.

These distinctive marks identify Wolverine seamless, non-ferrous tubing and help you buy tube with confidence.

We wish you could go through one of our plants—either through our Detroit plant or the new, modern plant in Decatur, Alabama, so you could see the great care that is exercised in making Wolverine tube—

how our system of Quality-Control assures you of tubing that will meet your exacting needs; and give you long, dependable performance.

Send for our new Flow Chart that shows you the various steps of Wolverine tube production.

#### WOLVERINE TUBE DIVISION

Calumet & Hecla Consolidated Copper Company INCORPORATED

MANUFACTURERS OF SEAMLESS NON-FERROUS TUBING
1451 CENTRAL AVENUE . DETROIT 9, MICHIGAN

Plants at Detroit, Michigan and Decatur, Ala.



Buy From Your Wholesaler

# THE Grader



EXCLUSIVE bonus features, found only on "Cat" Diesel Motor Graders, make these balanced rigs the best you can put on your payroll.

Take this "Cat" Diesel No. 12 Motor Grader, assigned to road maintenance in Sheridan County. Wyoming. With engine, clutch, transmission, final drive and blade mechanism all designed and built by "Caterpillar," it's got the matched power and balanced performance needed for road-wise mountain climbing. The boulder-pitted terrain is licked by the strength of the frame, 16-ft, blade and supporting circle. And the big, 100-HP. Diesel power plant furnishes ample drive to chew through hard going. With this "Cat" No. 12, Sheridan County averages 2 miles of mountain road main-

tenance per hour, 8 hours a day, operating in 3rd and 2nd gears. Snow, cold and emergencies caused by severe ranch country weather are the order of the day, but they don't slow down this big yellow machine.

"Cat" Graders are balanced—speed, weight, power—to keep going on location and get the best job results. The easy way they work shows you their left wheels know what their right wheels are doing.

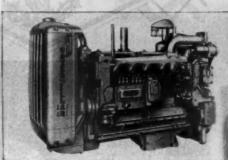
There are many features that make "Cat" Motor Graders best for your job. Why not ask your "Caterpillar" dealer to show you these "Caterpillar" exclusives?

CATERPILLAR TRACTOR CO. . PEORIA, ILLINOIS

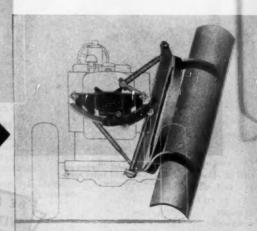
## THAT'S IN A CLASS BY ITSELF

- ONLY "Cat" Graders have "Cat" Diesel Engines for continuous service and economy of operation.

  It's part of balanced design that saves you operating dollars.
- ONLY the "Caterpillar" Motor Grader line has no orphans. Stocks of parts are maintained for each member of the "Cat" Grader family regardless of age. They work in harness—not die on the vine. Your original investment is protected.
- ONLY "Cat" Graders have a box-section blade supporting circle, made from a special angle produced on a "Caterpillar"-owned roll.
- ONLY "Cat" Motor Graders provide such excellent visibility for the operator. Power control box is mounted low, lift gear is mounted against the dash. Clean frame design permits the operator to see toe and heel of the blade, sitting down.
- ONLY "Cat" Graders have the long radius curved side shift rack that provides extra lateral shift to the blade assembly, together with the required vertical movement.
- ONLY with "Caterpillar" equipment do you buy-in on the world-wide "Caterpillar" dealer service—adequate parts inventory and factory-trained servicemen to keep wheels, tracks and engine turning on location.







## CATERPILLAR

DIESEL ENGINES . TRACTORS . MOTOR GRADERS . EARTHMOVING EQUIPMENT



## ONLY THE BEST

#### IS A TRADITION WITH MEDONALD

Old time craftsmanship combines with modern manufacturing methods to produce the finest in waterworks brass at McDonald's. Every item is individually tested to meet quality demands of the most exacting customers. When you specify McDonald, you specify the best.

Representing over 100 years of service in the A.Y. McDonald Mfg. Co. organization—George W. Avery, foreman, and Frank Otto, oldest employee in the Ground Key department.

> Overbead conveyor and dispenser of molding sand to the individual molder in the new foundry building.



Pouring brass into molds. Pourers are equipped at all times with safety equipment for accident prevention.



Riley Tensile Strength machine for testing capacity in the laboratory. Testing is conducted daily.





A. Y. MCDONALD MFG. CO.

BRASS GOODS . PUMPS . OIL EQUIPMENT



A HEAVY-DUTY MOTOR GRADER in every respect — designed and engineered to stand up under any going, to take more punishment, get more work done with less power effort. Some reasons for the AD-4's outstanding performance on every job:

**POWERFUL** — 104 brake hp.... General Motors 2-Cycle Diesel Engine... dependable, compact, economical, instant starting.

**HEAVY** — 22,140 lb. effective weight... balanced for maximum traction and control.

**STRONG** — Exclusive tubular frame . . . absorbs shocks, protects control rods inside frame.

ACCURATE — blade held firmly on work through direct down pressure...smoother cutting.

"ROLL-AWAY" MOLDBOARD — the moldboard that moves material the easiest way . . . by rolling it.

HIGH CLEARANCE under circle and axle to handle bigger windrows.

FULL CIRCLE REVOLVING BLADE—swings ahead of platform with plenty of end clearance.

FULL RANGE OF BLADE POSITIONS plus leaning front wheels, for handling all types of grading with ease.

LIQUID-WEIGHTED TIRES ON DRIVING WHEELS put more weight on the ground where it belongs . . . enable you to work on steeper slopes. Better traction, smoother riding, less tire wear!

PLUS . . . easier steering, full visibility, larger clutch, numerous other advantages.

"Seeing Is Believing."

Get the full story from your

Allis-Chalmers dealer . . . NOW!

"Roll-Away" is an Allis-Chalmers trademark.

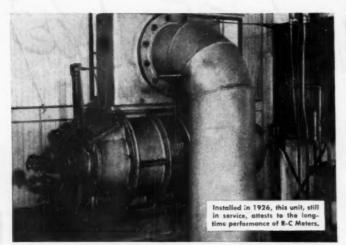


Choose the Right Size
Allis-Chalmers Grader to Fit
Your Needs From This
Complete Line.

		-			
MODE	EL BRA	KE	HP.	ENG	INE
AD-4	********	104	******	2-Cycle	Diesel
AD-3	*******	78	******	2-Cycle	Diesel
BD-3	********	78	******	2-Cycle	Diesel
BD-2	*********	50	.5	2-Cycle	Diesel
D		34	7	Gasolin	

ALLIS-CHALMERS

FOR GREATER PRODUCTION FOR EASIER OPERATION FOR SIMPLIFIED SERVICE



## NO PENSION FOR THIS OLD-TIMER even after 23 years of service

Accurate and dependable as always, this 23-year-old Roots-Connersville Meter still performs faithfully. No retirement for this veteran! Because new demands called for higher capacity, it has been transferred to another job in the same plant. Its old duties have been taken on by a new R-C unit, purchased because of fine performance of this old-timer.

That's a common history of R-C Meters. They're built to measure accurately, and keep on doing it, year after year. Simple design, finely machined measuring surfaces and other important refinements account for their ability to measure gas accurately and unfailingly, almost indefinitely.

With 31 standard sizes and capacities from 4,000 to 1,000,000 cfh, R-C Meters meet the needs of most applications. Write for Bulletin 40-B-14 or tell us your specific requirements.

#### ROOTS-CONNERSVILLE BLOWER CORPORATION 511 Poplar Avenue, Connersville, Indiana

(Right) This R-C Meter, with capacity of 317,000 cfh, replaced the "old-timer" above, now transferred to other duties.

(Below) Typical small capacity R-C Meter for low and medium pressures.







## **LETTERS**

TO THE Editor

#### A VOTE

For some time I have been wanting to write to tell you how much I have been interested in the way you have changed your magazine, and the article on Fluoridation of Water Supplies gives me a good opportunity to do so. I like the way you head your articles and the way you illustrate them. We are particularly interested in the fluoridation problem and I would like to have six copies of the September issue containing the above article.

Martin E. Flentje, Research Engineer, American Water Works Service Co., Inc.

(Ed. Note: What do the rest of you readers think of the changes we have been making? Shall we fire our Art Consultant and go back to the old way of doing things, or shall we keep him thinking up new and better ideas? He'd like to know and we'd like to know. You are the judge, so take a minute to write us your opinion.)

#### HYDRAULICS TRAINING

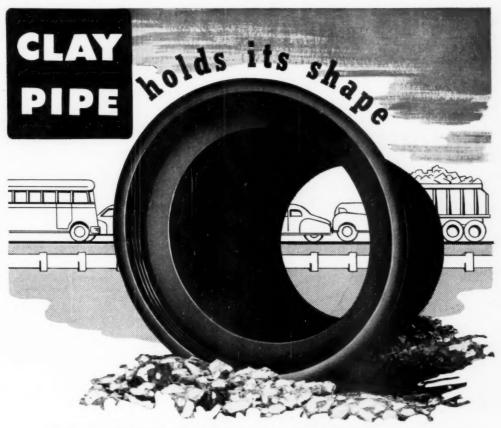
The article "Hydraulics Simplified" which appeared in your September issue has been read with interest by a number of our engineers. The subject matter has been presented in such a fine manner that it is believed the article could be used to advantage at Allis-Chalmers for training work, and we should like to have about 25 copies.

Allis-Chalmers Mfg. Co. Milwaukee, Wisc.

#### BOOKS IN BRIEF

#### HIGHWAY PLANNING

A bibliography of highway planning reports has been prepared by the Bureau of Public Roads. It lists, for the 20-year period, 1930 to 1950, articles and reports on traffic, origin-destination, location and



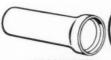
VITRIFIED CLAY PIPE is fired bard... it does not lose shape and flow capacity. Its rigidity keeps it round and smooth under the live or dead loads for which it is rated. Even under high temperatures, Clay Pipe holds its full inside diameter. It won't squash out — can't be cut or chewed by the rotary tools used to remove bulky obstructions from the line. In fact, Clay

Pipe can't be affected by any of the common causes of sewer failure. It doesn't rust, corrode, melt, crumble, or disintegrate. Its permanent, trouble-free life doesn't depend upon sulphide control devices or the delicate balancing of such factors as sewage temperature, velocities and age of sewage. It's the only pipe built to withstand any operating conditions.

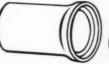
#### MATIONAL CLAY PIPE MANUFACTURERS, INC.

703 Ninth & Hill Bldg., Los Angeles 15, Calif. 100 N. LaSalle St., Rm. 2100, Chicago 2, Ill. 1105 Huntington Bank Bldg., Columbus 15, O. 206 Connally Building, Atlanta 3, Georgia SPECIFY





STANDARD-STRENGTH CLAY PIPE



EXTRA-STRENGTH CLAY PIPE



CLAY PIPE

## Use CLEVELANDS

Accurate Depth Control\* on your plus CLEVELANDS ruggedness, dependability and speed\_makes CLEVELAND TRENCHERS the machines that really pay out on the HIGHWAY specialized highway jobs as well as on the routine trenching applications. \*Note CLEVELANDS pat-**JOBS** ented Dual Pivoted Grade Indicator, showing above the Trencher in the picture: See your local distributor for details & specifications. THE CLEVELAND TRENCHER CO. 20100 ST. CLAIR AVENUE CLEVELAND 17, OHIO

CLEVELA'NDS MORE TRENCH IN MORE PLACES at LESS COST highway-needs studies. It covers city, county, state and private agency reports. 48 pages. For sale by Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 30 cents.

#### SOIL FERTILITY

This book pertains to the use of sewage by-products in agriculture. It is based on the experiments carried on in South Africa during the past ten years, and includes fly studies, compost temperatures, earthworms, plant residues, labor costs, production costs, chemical substances used and techniques of production. 236 pages; 28 photographs; \$4.50. Dover Publications, Inc., New York.

#### TREATED WOOD

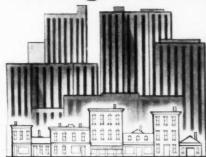
This is a 3-page set of specs covering recommendations for buying wood treated with formulations of pentachlorophenol to resist decay, insects or dimensional changes. Dow Chemical Co., Midland, Mich.

#### LEADERS IN PUBLIC WORKS

The picture on this month's front cover shows Samuel S. Baxter, presumably at work in his office in City Hall Annex, Philadelphia. Sam Baxter has been with the city, in various engineering positions, for 27 years and is now acting chief engineer, responsible for the sewage treatment program, sewerage, airports, bridges and many other engineering problems. During World War II, he served as major of the Corps of Engineers with the wellknown Manhattan District, organized the first Town Government of Oak Ridge, and was its first Town Manager, with responsibility for the design of all facilities.

He is a member of the ASCE and past president of the APWA; also a working member of various other organizations. He lives with his family, wife, son and daughter, in suburban Somerton. Aside from his deep interest in municipal administration, he claims his hobbies to be his family, his church and a "yen for travel."

## **Taking Care of GROWING Jackson**



Growing cities often present innumerable headaches to their administrators . . . and for a time Jackson, Mississippi proved to be no exception. The increased industrialization of the area had meant new factories and new faces. Public facilities that were once adequate had become outgrown.

This was the situation that confronted the Jackson water system. There was an insufficient water supply with reduced pressures during peak load periods. Some 19,500 customers were feeling the effects.

A solution to the problem had to accomplish two things. It not only must be able to meet the existing water demands but it also should provide for any future growth of this southern capital city.

As it had done twice before, Jackson called upon a Horton elevated tank to help. The 1,000,000 gallon water tank shown at the right was installed. It doubled the existing elevated storage capacity, and now gives Jackson an abundant supply of water under gravity pressure.

The radial-cone bottom design of the Jackson installation is particularly adapted to large capacity tanks in that it does not have an excessive range in head. The distance between the high and low water levels is no greater than 250,000-gallon units. This reduces the average head and thus lowers the pumping costs. The welded steel construction insures durability, simple maintenance and clean appearance. Rust and corrosion have no place to hide.

Horton radial-cone tanks are available in capacities from 500,000 to 3,000,000 gallons. If you have a water problem or foresee one in the future, write our nearest office for an estimate on your elevated storage requirements.



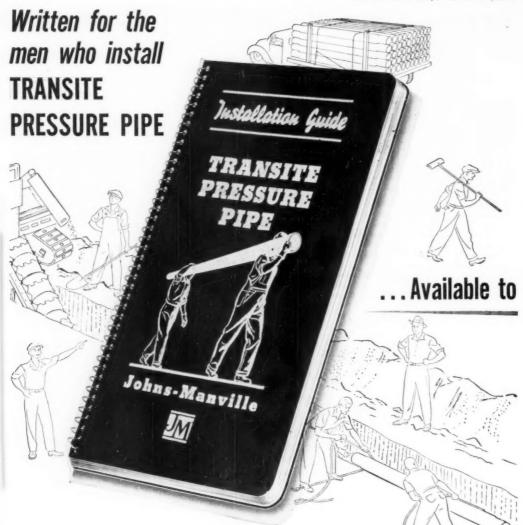
## HORTON

STEEL STORAGE TANKS
...for municipal service

#### CHICAGO BRIDGE & IRON COMPANY

Plants in Birmingham, Chicago, Salt Lake City, and Greenville, Pa.

Atlanta 3 2123 Healey Bidg, Birmingham 1 1532 North Fiftieth St. Boston 10 1038-210 Devonthire St. Chicago 4 2115 McCormick Bidg, Cleveland 14 2221 Guildhall Bidg. Detroit 26 1536 Lotyetre Bidg. Houston 2 2142 Notional Standard Bidg.



As ITS TITLE IMPLIES, this new Installation Guide was designed especially for those who do the actual work of installing Transite\* Pressure Pipe...a handy working tool intended to help the man in the field do a good job in an economical way.

But it answers so many questions of general interest about Transite Pipe that it is being offered, without cost, to anyone concerned with

\*TRANSITE is a Johns-Manville registered trade mark

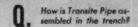
the design, construction or operation of a water system.

Send for your copy today. It will give you a new insight into Transite's many practical features that reduce water line installation costs... help answer some of the questions you may have about this Johns-Manville asbestos-cement pipe that is contributing to better and more economical water systems for thousands of American cities and towns.



Johns-Manville TRANSITE

FOR BETTER





A. By means of the Simplex Coupling, a factory-made joint. See page 38.

How are joints checked for correct assembly in advance of leakage tests?



A. By the use of a simple feeler gage as described on page 50.

Are standard practices used for making joints at fittings?



A. Yes—see "Making Joints at Fittings" page 78.

## anyone who wants the answers to questions like these

Can you cut, machine and tap Transite Pipe in the field?



A. Yes—see "Cutting Transite Pipe" page 72 and "Service Connections" page 91. How are size and type of thrust blocks at fittings determined?



A. The Guide gives helpful data, including tables, construction, and location. See page 82.

What about trench preparation, supporting the pipe, and tamping?



A. Standard methods are employed. See pages 16, 23 and 97

Just use the coupon—or write to Johns-Manville, Box 290, New York 16, N. Y. In Canada, address 199 Bay Street, Toronto, Ontario.

ASBESTOS- PRESSURE PIPE

WATER SERVICE

Johns-Manville

Box 290, New York 16, N. Y.

Please send me the Transite Pipe Installation Guide (TR-62A).

Name

Organization

Address\_

City

PW 11-5

When writing, we will appreciate your mentioning PUBLIC WORKS



The new Dorrco Aerator-Clarifier is a compact, low-cost unit combining the functions of preaeration, flocculation and sedimentation in a single tank. It is applicable wherever it is advantageous to increase suspended solids and B.O.D. removals-where odor control or elimination is necessary - or where flocculation with or without chemicals, is beneficial. It fits equally well into primary or secondary treatment flowsheets . . . with notable advantages in both.

> Highlights of Aerator-Clarifier superiority are listed at the right, but it will pay you to check the complete story of the design and operating characteristics. A Dorr engineer will gladly tell you more . . . without obligation.

#### DORRCO AERATOR-CLARIFIER

ADVANTAGES as compared with separate preaeration and sedimentation tanks.

- 1. Compact . . . single tank saves ground
- 2. No solids interference in geration chamber . . . grit and heavier solids settle quickly, avoiding interference with flocculant material.
- 3. No breakup of floc structure . . . low transfer velocities from Aerator to Clarifier section eliminates breakup of flocculated material.
- 4. Minimum of short circuiting . . . spiralflow aeration effect in Aerator minimizes short circuiting.
- 5. Simple maintenance . tubes are removable for cleaning or replacement without interfering with operation of the unit.
- 6. Low cost . . . single tank and simple design cut installed cost.



#### THE DORR COMPANY, ENGINEERS

NEW YORK . ATLANTA . TORONTO CHICAGO . DENVER . LOS ANGELES RESEARCH AND TESTING LABORATORIES

SUGAR PROCESSING

PETREE & DORR DIVISION, STAMFORD, CONN. ASSOCIATES AND REPRESENTATIVES

Dorr Technical Services and Equipment Are Also Available Through Associated Companies and Rep-resentatives in the Principal Cities of the World. Names and Addresses on Request.

RESEARCH



# They go together— for best results

**SALT AND BANOX\*** go together to make the unbeatable team for snow and ice control. With Banox added costly corrosion is no longer a problem.

With the BANOX-SALT team you can now:

- ELIMINATE motorists' complaints about automobile rusting
- PROLONG life of publicly owned vehicles by preventing costly corrosion
- PROTECT metal bridges, ramps, garages and other community property
- REDUCE labor of deep snow and ice removal by preventing ice bonding
- ELIMINATE costly removal of abrasives from gutters, catch basins and sewers
- SPEED up traffic movement
- REDUCE pedestrian and vehicular ice accidents
- KEEP your community free of wind-borne abrasive dust and dirt

Scores of progressive communities have already discovered the savings Banox affords. As little as 1% of Banox mixed with the salt reduces costly corrosion.

Let us send you full information on this phenomenally successful, new way to end your winter-weather worries.

\*T.M. Reg. U.S. Pat. Off



# HOW CITY OF ROCHESTER SAVES \$2000.00 EVERY COVERAGE BY USING STERLING ROCK SALT FOR SNOW and ICE REMOVAL!



#### EDWARD F. NIER

Commissioner of Public Works, Rochester, N. Y.

cites remarkable advantages of STRAIGHT STERLING ROCK SALT versus Salt and Cinder Mixture



SAVED \$5.42 PER MILE BY USING STRAIGHT ROCK SALT



SAVED \$2,005.40 EVERY COVERAGE BY USING STRAIGHT ROCK SALT

## - CITY OF ROCHESTER, N. Y.----

Comparative Costs: STRAIGHT ROCK SALT vs. SALT AND CINDERS

SALT-CINDER MIXTURE - (1947-48) - (370 MILES SERVICED)	STRAIGHT ROCK SALT - (1949-50) - (370 MILES SERVICED)
COST OF CINDERS	COST OF SALT
Delivered Storage Yard, Per Cubic Yard \$ 1.40	(\$9.50 Per Ton Delivered Unloaded Storage Yard) \$ 9.50
COST OF PILING	
Per Cubic Yard	COST OF PILING SALT
(150 # Per Cu. Yd. Cinders), Per Cubic Yard	Per Ton
COST OF PILING SALT	COST OF LOADING SPREADER TRUCK
Per Cubic Yard	At Time of Storm, Per Ton
COST OF LOADING SPREADER At Time of Storm Per Cubic Yard	COST OF SPREADING SALT
COST OF SPREADING	(12 Tons Salt, 1000 # Per Mile, Truck Cost \$.30 Per Mile,
Salt-Cinder Mixture Per Cubic Yard	Labor \$2.20 Per Hour Per Ton)
SPREADING COST PER CUBIC YARD \$ 3.10 Rate: 3 Yds. Per Mile 3	COST OF SALT LAID
COST PER MILE FOR SALT-CINDER MIXTURE LAID DOWN \$ 9.30	Per Ton\$10.75
ADD:	SPREADING RATE:
Spring Cleaning Cost to Remove Cinders from Basins & Receivers	2 Miles Per Ton
TOTAL COST PER MILE FOR SALT-CINDER MIXTURE \$10.80	TOTAL COST PER MILE USING STRAIGHT ROCK SALT \$ 5.38

OVER \$2000.00 SAVED EVERY COVERAGE



Order STERLING Action ROCK SALT Now!---

INTERNATIONAL SALT COMPANY, INC.

SCRANTON, PA.

## FILTER PLANTS

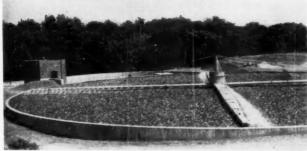
## TODAY'S: use vitrified clay filter bottom blocks



PLACE: FREDERICK, MD.

ENGINEERS: WHITMAN, REQUARDT & ASSOCIATES

Roy H. Ritter, Partner WHITMAN, REQUARDT & ASSOCIATES



#### THE PLANT:

Capacity 3.5 mgd

120' dis. Bio-Fifter with 4' stone depth Recirculating ratio of 4 to 1

Floor of Vitrified Clay Filter Bottom

I final settling tank 100' dia., 9.5' side wall depth

4 Float controlled recirculating pumps

THE ENGINEERS: Whitman, Requardt & Associates, consulting engineers since 1915, engage primarily in the design and supervision of construction of water and sewage treatment plants; airports; industrial plants; mechanicalelectrical work on schools, hospitals, etc.; heating and power stations; roads; bridges and related types of work.

They have designed water and sewerage systems and plants for Baltimore, Martinsburg, Norfolk, Wilmington, Richmond, and other cities; and airports, viaducts, housing projects, etc., in Virginia, West Virginia, Maryland, and other states.

THE BLOCKS: Vitrified Clay Filter Bottom Blocks, made by members of the TRICKLING FILTER FLOOR INSTITUTE, are especially designed to insure best operating results from all kinds of trickling filters. They provide the proper ventilation and clean run-off so necessary for successful, trouble-free operation.

They are strong, easy to lay and to work on afterward, acid-resistant and accepted everywhere as the best material for filter floors. Ask for engineering facts from any member whose name is listed below.









### TRICKLING FILTER FLOOR INSTITUT

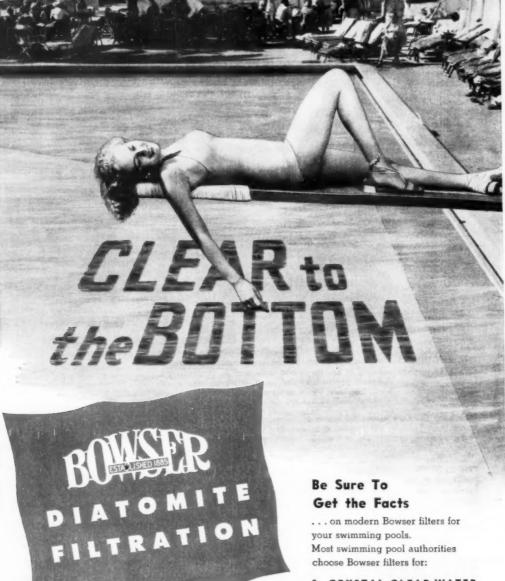


RESIST ACIDS EASY TO LAY PROVED BY USE WON'T CLOG





Texas Vitrified Pipe Co. W. S. Dickey Clay Mfg. Co. Ayer-McCarel-Reagon Clay Co. National Fireproofing Corp. Bowerston Shale Co. Pomona Terra-Cotta Co. Kansas City 6, Me. Brezil, Ind. Pittsburgh 12, Pa. Bowersten, Ohio Pemona, N. C. Mineral Wells, Tex.



- 1. CRYSTAL CLEAR WATER
- 2. LOWER OPERATING COSTS

Write today for a FREE copy of the Bowser booklet "The MODERN way to filter swimming pool water."

BOWSER, INC., 1395 Creighton Avenue, Fort Wayne 2, Indiana

LIQUID CONTROL SPECIALISTS SINCE 1885

When you need special information-consult READERS' SERVICE DEPT. on pages 85-89.

#### COME SUMMER'S SUN . . . OR WINTER'S COLD



Even under the hottest summer sun, roads built with TARVIA\* road tar are glare-free and restful on the eyes. They take the strain out of driving. Self-healing, they stay smooth for easy riding. They will not wave, roll, push, or bleed.



Winter's snow and ice melt faster, thanks to the heat-absorbing black surface of roads built with TARVIA road tar. Snow removal is facilitated. And, furthermore, neither calcium chloride nor sodium chloride has any adverse effect on TARVIA road tar surfaces.

Barrett's 46 years of experience in road building, maintenance and repair is yours for the asking. Ask the Barrett field man.

#### THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION 40 Rector Street, New York 6, N. Y.

New York \* Chicago \* Birmingham \* Detroit Philadelphia \* Boston \* Rochester Youngstown \* Ironton, O. \* Syracuse \* Buffalo Bethlehem, Pa. \* Portland, Me. \* Norwood, N.Y. \* Oneonto, N.Y. \* Elmira, N.Y. \* Cromwell, Conn. \* Norwich, Conn.

In Canada: THE BARRETT CO., LTD.

Montreal \* Toronto \* Winnipeg \* Vancouver



The slightly granular, "tractionized" surface of a road built with TARVIA road tar gives tires a better grip.



\*Reg. U. S. Pat. Off,

# GHIGH CYCLE 2 for LOW COSTS

## High Cycle Tools Operated by a HOMELITE Dual Purpose GENERATOR will greatly reduce your costs

High cycle tools are not only here to stay... they're here to save. Lighter in weight... easier to handle... more efficient in operation... these modern tools are saving money or total gown man hours. Yes, and they're saving money on tool repairs because high cycle tools are far easier to keep in good condition. And the beauty of it all is this:

And the beauty of it all is this: — These savings are yours any place on your road if you have a Homelite Dual Purpose Generator. Light enough for one man to carry, this gasolineengine-driven generator can be easily put into action anywhere. It provides plenty of power for operating high cycle tools. Moreover, this same generator can also be used to operate floodlights or your present standard universal tools.

Look into this Homelite Dual Purpose Generator. It's a big step in the right direction towards lower costs through high cycle operations.



For operating high cycle concrete vibrators



For operating high cycle wrenches



For operating Homelite Electric Chain Saws

#### STICK TO THE RULE OF THREE AND YOU'LL ALWAYS STICK TO A HOMELITE

1. Performance. A Homelite gives you plenty of power where you want it, when you want it ... power with a large overload capacity ... power that isn't sapped by long dangerous cables. It is not affected by extreme temperatures and is dust proof, rainproof, poolproof.

2. Dependability. The famous Homelite dependability is the result of building more than 279,000 gasoline-engine-driven units during the past quarter century. Finest, tested materials, precision workmanship, plus sound simplicity in advanced design are part of every Homelite.

3. Service. Close field supervision of every Homelite unit is a part of Homelite service. If you ever need repairs, there's a trained Homelite representative near you . . . ready for your call . . . ready to give you instant repair service in the field or in his completely stocked shop.

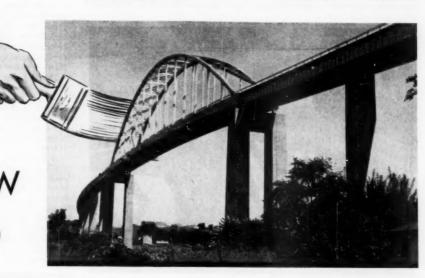
Carryable
Pumps • Generators •
Blowers • Chain Saws
• Paving Breakers



#### PUBLIC WORKS MAGAZINE

**NOVEMBER, 1950** 

Volume 81 . No. 11



## TABRIDGE

H. C. JESTER Chief Chemist Jos. Dixon Crucible Co.

A DEQUATE maintenance of bridges, metal structures and railings is a knotty problem, the most important factor in which is usually the ever-present limited budget. Money is tight, and local governments, unable or unwilling to increase taxes, are reluctant to appropriate funds. This policy naturally results in delaying of needed repairs and repainting far too long, which inevitably culminates in excessive costs when the job is finally done.

In most cases the city or county engineers are aware of the condition of their physical plant, and equally aware of the work needed. However, they are unable to do much about it-they are limited by the budget. Therefore it becomes obvious that securing the very best service possible when jobs are done becomes of paramount importance. Extra years of adequate protection, mean future savings in structural repairs and replacements.

In some cases, engineers are burdened with so many responsibilities that giving every phase of their job full attention is a sheer impossibility . . . they can't take care of everything . . . and do the job right. This is primarily true in the smaller communities, and rural counties. In the case of the larger cities, with their correspondingly larger incomes, specialists in every phase of maintenance can be afforded, and are provided. Another case in point is railroads, where maintenance is a highly developed science. Here the responsibility rests directly on a "Bridge Engineer" who is highly trained in inspection procedures, methods and materials.

In view of the fact that structural repairs are by far the most costly items on any maintenance budget concerned with highway (or any other type) bridges, serious consideration must be given to means of preserving existing structures, thus making replacement of members unnecessary. The one thing that will achieve this end is an adequate protective painting program, based on a thorough knowledge of painting economics.

Painting economics may be summed up as the cost per year of protection on any given area of structure. Among the various factors that determine the result, three are fundamental: (1) Surface preparation; (2) Application; and (3) Primer and Paint Utilization.

The final result is dependent on all three of these factors. There must be a clear understanding that each is dependent on the others; not one of them can be overlooked and satisfactory results still be obtained

In placing this system of "painting economics" into practical use, a definite order of procedure is recommended.

The first step in setting up such a system is to establish a regular inspection schedule. The second step is to adhere to it.

Again referring to the practice of the railroads, who have probably made closer studies of bridge maintenance problems than any other group or industry, a regularly scheduled bridge inspection tour is conducted every spring.

In the case of highway bridges also, an annual spring inspection trip is recommended. Spring is the best time for this for several reasons: (1) Winter damage can be assessed: (2) the warm weather bridge, so that the best protective plan can be put into effect, with a minimum of waste and expense.

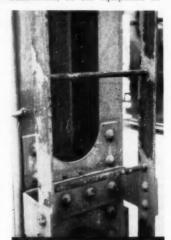
The first item to be taken care of is repairs and alterations. By far the best results will be obtained if ticular cleaning is necessary—new paint may be applied right over the old, where there is no rust.

#### Surface Preparation

Of the three fundamental factors in "Painting Economics", surface preparation is perhaps the least understood. More paint failures can be traced directly back to improper or inadequate surface preparation than all other causes put together.

There are a number of methods by which surfaces may be satisfactorily prepared for paint. The method used is determined largely by the condition of the structure, although availability of labor, and financial considerations are also involved.

If the bridge is generally rusty, the best methods would be either sand-blasting or flame cleaning. It would be too costly to clean an entire bridge with any hand method, unless the bridge is a very small one and of simple construction. Regardless of which method is decided upon, the job will have to be done, in most instances, by outside contractors, as the equipment ne-



 SURFACE preparation will now cost more than routine painting on this ladder.

cessary to either sand blast or flame clean a bridge is not usually found in the average city or county highway department garage. Determination of the method can best be solved on a price basis, as indicated by competitive bidding.

However, in the case of partial rusting, the choice of having outside help or using your own crews will depend largely on what amount



 NOTE how rust has spread along the angle of this handrail; it will cost considerable to prepare and paint this railing.

months are just commencing, allowing time for repairs and painting; and (3) in the northern latitudes the extensive use of various de-icing solutions may have had an adverse effect on the paint film, which can be observed, and corrected if necessary.

Inspection should be thorough. No bridge can be examined from a moving automobile. Particular attention should be given to rivet heads, angles, and those points where steel members are embedded in, or touch, masonry, for these places are where rust first appears. The underside of the bridge is very important, also. as it is subject to constant dampness and condensation, to say nothing of drainage. Accelerated corrosion usually is found on the underside, and it is here that the real damage starts. Due to the conditions which prevail, most repairs will be needed here. Because of its relative inaccessibility, repairs here are more expensive than on the top-side, and therefore here is one place in particular where a well-planned painting system will really effect savings.

#### **Evaluate Findings**

After the inspection has been completed, it is necessary to evaluate carefully the condition of the all painting is deferred until needed repairs have been entirely completed. By this it is not meant that a bridge should not be painted because certain major alterations are planned at some future date, such as widening, etc. If this were done, excessive corrosion would take place, and the alteration program might very well be transformed into an emergency replacement program.

Repairs planned, contracted for, and executed, the next thing to consider is the state of the existing paint film. If the structure is in a state of general rust, with quantities of loose scale, and deep pitting. a major clean-up operation is in order. However, if the rust is spotty or partial, and the rest of the film is still giving protection, and is tightly bonded to the steel, cleaning may be confined to the rusted areas. Another symptom that should be carefully observed is where the finish coats are wearing out, but no actual corrosion has as yet occurred. This may be distinguished by noting whether or not the primer is visible here and there. This is a sure sign of incipient paint failure, as primer by itself will not stand weathering as well as when it is protected by the finish coats. In this case, no parof manpower you have available, and what other projects they are engaged on. Assuming the job is to be done with city or county forces, it will be found that heavy rust and scale is removed fastest and easiest by the use of scrapers. These should be the heavy-duty type as used by ship outfitting yards and the Navy, for dressing down steel ship hulls. Chipping hammers and wire brushes also have their place here. However, heavy rust cannot be handled by wire brushes. It must be dug and pried out with scrapers. Wire brushes come in very handy where the rust deposits are light, and relatively new.

Wire wheels, used in conjunction with either electric or pneumatic hand tools will be found very helpful, and because of their higher speed of operation, they will help hold down costs. If power is available, the electric tools are perhaps the wisest choice. However, in the event that power cannot be made available on the site, the use of a gasoline driven air compressor, and penumatic hand tools will prove equally satisfactory.



 PAINT film has failed. Members were removed for repairs.

The selection of the proper wire wheels is very important. A distinct cutting action is desired.-not a polishing or burnishing action. Therefore, the wheels should be coarse. Wire size should be .014, or coarser, and the diameter of the wheel should be as large as can be swung by the equipment used, without excessive loss of speed. Another excellent combination is a wire cup brush used in conjunction with a power sanding machine. In the event that such a power sander is used, even coarse grit discs may be used. Bear in mind that the purpose is to remove rust and corrosion rapidly, not necessarily getting a perfectly smooth finish, such as an automotive repair shop would want, but rather with the emphasis on speed. However, discs of such coarseness that the steel itself is gouged and ground away are of little use. The wire cup brushes, using about a 6" brush in a power sander that will swing a 9" sanding disc will be adequate.

If pneumatic tools are used at all, adequate air must be provided. Portable compressors are on the



PAINT film just starting to go. Prime coat failure in center.

market that will do the job nicely. However, make sure that enough air is provided so that the pressure will not drop when the tools are being used, resulting in a loss of efficiency.

While on the subject of surface preparation, it cannot be too strongly stressed that no matter who does the cleaning-local labor or outside contractors, the surfaces should be really clean before starting to paint. Some specific individual, either the engineer in charge of the job, or someone appointed by him, should have the distinct responsibility not to permit any painting until the surfaces are satisfactory. This is most important, due to the fact that the best paint is immediately placed under a very strong disadvantage if the surface is not up to par.

All loose scale, peeling paint, blistered paint and rust must be removed. Those areas where the old paint film is still tight and unbroken, may be left, and new paint applied over the old.

Chalked paint surfaces are satisfactory, and the fine rust (iron oxide) left after wire brushing, will also provide a satisfactory surface for the application of primer.

Every effort should be made to see that the work progresses in an efficient and orderly manner, with as little lapse of time as possible from the start of cleaning until the finish, and from there to the start of the actual painting. As surfaces are cleaned, they immediately become subject to new oxidation, and too much elapsed time may result in largely nullifying the work already done. Priming coats should be gotten onto all exposed areas just as fast as possible. It is generally not advisable to follow right on the heels of the cleaning crews, with spot or full primer. There is too much chance of the prime coat being damaged-especially while still wet. However, there is no objection to applying spot priming while cleaning work is still being done on other parts of the bridge not in close proximity.

#### **Application Conditions**

Weather conditions are most important, when painting is scheduled. No painting of any description should be attempted in inclement or threatening weather. No painting should be done when weather reports indicate rain is in the immediate offing. Surfaces, besides being



 PAINTING was deferred too long; complete cleaning needed.

clean, must be dry, and free of frost.

It is inadvisable to apply any paint when temperatures are below, or in all probability will fall below, 40°F. Temperatures below this point do not do any harm to the paint, per se. However, cold in this degree does retard the necessary oxidation of the paint vehicle, preventing the hardening of the film, and making it more liable to damage by rain, dirt, and abrasion.

Upper limits of temperature arecontrolled only by practical conditions, such as the availability of labor during the "dog days."

Humidity is another factor that can have an effect on the ultimate durability of the paint film. Generally speaking, painting with a relative humidity of 90 or over, and with no breeze or air currents, is inadvisable. The reason is that the high moisture content of the air will retard the evaporation of solvents, and the oxidation of the vehicle, with the same effects as painting in low temperatures. However, this cannot be taken as a strict rule, as humidity and its effects are variable, due to temperature changes, and air currents, which have a great influence on the final result. Also, there is the economic consideration—painting crews are not generally taken off the job merely because of high humidity.

#### **Application**

The second fundamental of "Painting Economics" is application. Method of application has as much bearing on the final result as either surface preparation or the paint used. No protective painting program will give satisfactory results unless care is exercised to make certain that the paint film is of proper thickness, with no gaps or "holidays" in the film which would allow corrosion to get a toe-hold.

While there are many ways of applying paint and enamels to various objects, in the case of highway bridges, there are only two methods which can be used: Brush and

spray.

For many years the use of the brush method has had more or less universal acceptance. In recent years, developments in the field of spray equipment have resulted in some use of the spray method. Under certain conditions, it has proved satisfactory. Both methods have their inherent advantages and disadvantages, and local conditions will have to be the deciding factor in the choice.

The advantage of using the timehonored brush method are, briefly, a generally heavier film, and a more uniform film. In some quarters it is felt that a better bond between the metal and the paint is secured through the use of a brush. Chief disadvantage is that initial labor costs are higher. However, in viewing this last point, it must be remembered that thickness of film is one of the chief deciding factors in the durability of the paint job.

When using brushes, round or oval brushes should be specified. If the construction of the bridge has large flat or plane surfaces, such as platework, the use of flat brushes on this portion would be permissible. Paint should be thoroughly applied, and well-brushed onto the surfaces, and into all cracks and fissures, angles, pockets, etc., without leaving fins or runs.

Motion of the brush should be in small circles as the paint is applied. After complete coverage of the area has been secured, the paint may be smoothed out by a series of parallel strokes. On vertical surfaces, the finishing strokes should be vertical. The painting foreman, or whoever is in charge of the crew, should instruct the men that no one spot is to receive more than three parallel or straight strokes of the brush, as more than this thins the film too much.

Sheepskin daubers of various sizes will be found handy in getting paint into small holes and pockets inaccessible to brushes. Construction of these daubers is simple, consisting of poles of various lengths, with swaiches of wooly sheepskin tied to one end. Sizes of the swatches will depend on local conditions.

#### **Spray Painting**

Advantages of spray painting, assuming the necessary power and compressors are available, is that this method is faster than brush, and therefore less expensive, due to lower labor costs, less rigging needed, and ability to reach inaccessible spots. Disadvantages are primarily a higher paint consumption per square foot, due to wastage, and "misting"-a condition where wind deflects the paint spray away from the area to be painted. This can result in an uneven paint film, with possible sacrifice of paint durability. Assuming that a compressor of suitable capacity is already available, initial cost for equipment is not too far out of line. Spray equipment can also be used for certain other types of municipal paintings, so the investment may be justified.

No matter which method of applying the paint is finally selected, a sound painting system must be decided upon. Within practical limits, of course, the durability of the job is directly dependent upon the final thickness of the paint film. The thicker the film-the longer the paint will last. In maintenance painting of bridges, the first step is the primer. If 25% or less of the total area of the bridge was cleaned preparatory to painting, spot priming (applying a coat of primer just to the cleaned surfaces) will be found satisfactory. If over 25% was cleaned, it will be cheaper and better in the long run to apply a single coat of primer to the entire struc-

A prime coat, followed by two finishing coats is the most satisfactory. If this system is used, the intermediate coat should be of a different shade than the prime coat, so that "holidays" or areas where the final coat was not applied can be more easily spotted, and corrected.

If budgetary considerations force the program to be curtailed, the intermediate coat could be dispensed with. However, under no circumstances should the prime coat be skipped, and the two coats of finishing paint be used, unless painting was done before rust and corrosion made cleaning necessary. If the old paint was unbroken, finish coats may be applied directly to the old film, without a prime coat.

(Continued on page 76)



HOW rust begins at the joints and progresses outward. Incomplete cleaning in the first place was the primary cause.

## STEEL REQUIRED

for

#### SEWAGE TREATMENT PLANTS

DATA on the amounts of reinforcing steel, miscellaneous steel, iron castings and cast iron pipe have been furnished to us for 15 sewage treatment plants. Structural steel, including that contained in the treatment equipment, is omitted from the tabulations. Plants, plant sizes, cost and source of information are as follows:

#### TABLE I - SIZE AND COST

Location	Size, M G D	Cost
Bristol, Conn.	3.5	\$820,000
Rockville, Conn.	2.5	600,000
Laconia, N. H.	1.6	600,000
Marlboro, Mass	. 1.4	205,000
Jamestown, N. \	Y. 7.5	1,900,000
Boat Harbor, Vi	a. 6.0	855,550
Pinners Pt., Va.	10.7	906,700
Alexandria, Va	9.4	1,527,174
Nassau Co., N.		7,294,473
Tampa, Fla.	36.0	1,521,153
Camden, N. J.		573,399
Linden-Roselle,	N. J	1,135,935
Altoona, Pa.		719,000
Bethlehem, Pa.		2,424,000
Monticello, N.	Y. 2.0	250,000

Information on the first five plants above was furnished by Metcalf & Eddy, consulting engineers of Boston. Costs for Rockville and Jamestown are estimated. Information on the second five plants came from Greeley & Hansen, consulting engineers of Chicago. The cost of the Alexandria plant is estimated. The data on the final five plants were furnished by McElwee-Courbis Construction Co., Inc., Erlton, N. J. These represent five recent jobs bid on by this company and, except in the case of Monticello, are not necessarily the low bid.

The total cost represented by the figures given in the table amounts to \$21,312,384. For the eleven plants on which capacity data are avail-

able, capacity is 107.6 mgd, and cost per mg is \$153,000.

The total amount of reinforcing steel, miscellaneous steel, and cast iron pipe and fittings aggregates 10,974 tons. Conditions differ greatly from plant to plant; moreover, not all of the plants shown are complete plants. Nassau County's plant is activated sludge; Monticello is building a 2 mgd. two-stage high rate filter; but Boat Harbor, Pinners Point and Alexandria provide primary treatment only. On the eleven plants for which capacity is given. 95.5 tons of ferrous materials are required per million gallons of capacity. The range is from 22 tons per mg for Tampa to 148 tons per mg for Laconia.

A better basis of estimation appears to be plant cost. For the fifteen plants, the average is 507 tons of reinforcing and miscellaneous steel and cast iron pipe and fittings per million dollars of cost. The range is from 309 tons to 980 but a considerable number of the plants are fairly close to the average.

#### Reinforcing and Miscellaneous Steel

For the 15 plants, a total of 7,077 tons of reinforcing steel is required. On the basis of the plant costs given, this amounts to 332 tons per million dollars. The eleven plants for which capacity figures are given have a combined capacity of 107.6 mgd; reinforcing steel for these amounts to 4,993 tons, an average of 46.4 tons per mg. An average of 126 pounds of reinforcing steel is required per cubic yard of concrete for the five plants reported by McElwee-Courbis.

Miscellaneous steel and "light iron" is reported for twelve plants, totalling 528 tons. This may or may not include floor grating and similar material. In the Greeley &



Hansen reports, floor gratings are given separately. The five plants reported by them require 4,335 sq. ft. of such gratings.

#### Cast Iron Pipe and Fittings

Those plants employing two-stage high rate filters use a great deal of pipe. In all of the 15 plants reported, a total of 3,325 tons of cast iron pipe and fittings is required, of which nearly one-third (1,065 tons) was estimated for the Bethlehem plant. On the eleven plants on which capacity data are available. an average of 15.5 tons of cast iron pipe and fittings is required per million gallons. Much depends on size of plant and method of treatment. The five relatively small plants reported on by Metcalf & Eddy require 38 tons of pipe and fittings per million gallons of capacity. The Monticello plant requires 90 tons for its 2 mgd capacity, or 45 tons per mgd. The two largest plants, Nassau County and Tampa, reported by Greeley & Hanson, use only 470 tons of pipe and fittings for a total capacity of 63 mgd.

On the basis of plant cost, 156 tons of cast iron pipe and fittings were used per million dollars of

The amount of reinforcing steel, miscellaneous steel, and cast iron pipe and fittings reported for each plant are shown in Table II.

#### TABLE II - TONS OF FERROUS MATERIALS

Plant	Reinf. Steel- Tons	Misc. Steel- Tons	CI Pipe & Fit tings-Tons
Bristol, Conn.	171.0	26.5	177.0
Rockville, Conn.	111.5	12.5	119.0
Laconia, N. H.	126.2	20.0	90.5
Marlboro, Mass.	102.5	9.0	89.5
Jamestown, N. Y.	515.0	70.0	151.5
Boat Harbor, Va.	363.0	32.0	156.0
Pinners Pt., Va.	308.5	24.0	81.5
Alexandria Va	735.0	18.5	245.0
Nassau Co., N. Y.	1,800.0	122.5	335.0
Tampa, Fla.	640.0	33.0	135.4
Camden, N. J.	175.0	10.0	130.0
Linden-Roselle, N. J.	533.0	****	300.0
Altoona, Pa.	277.0	12.0	160.0
Bethlehem, Pa.	1,100.0		1,065.0
Monticello, N. Y.	120.0		90.0

P RESTRESSED concrete cylinder pipe, built to withstand high bursting pressures, is widely used in the construction of water systems. Basically, this pipe consists of a substantial concrete lining inside a sheet steel cylinder, spring steel wire wound around the cylinder, and an exterior coating of cement mortar. Standard sections are 16 feet long and are produced domestically in diameters from 16 inches to 48 inches.

In manufacture, the concrete lining is either spun centrifugally or poured vertically inside the cylinder and allowed to cure. Spring steel wire is then wound helically under a uniformly high tension around the steel cylinder and anchored at both ends. Mortar shot at high velocity against the cylinder forms a tightly adhering exterior coating. When this

der pipe, and many thousand miles of pipe of this design have been giving excellent service. However, during the past 10 years prestressed concrete cylinder pipe has found increasingly wide acceptance because it has the advantage of: (1) lesser tonnage of reinforcement through the use of higher quality steel; (2) reduced pipe deadweight; (3) increased resistance to external loads.

Take for example one pipe size: Conventional reinforced 48" diameter pressure pipe designed for 100 pounds working pressure requires more than twice as much weight of steel as a similar design of prestressed concrete cylinder pipe. This is due to the fact that a heavier cylinder is required, and a far greater weight of mild steel reinforcing rod is necessary to produce the same resistance to internal pres-

ing in deadweight of the finished pipe.

On large water systems, these savings multiply rapidly. In the 80 miles of 48", 36" and 24" pipeline provided by Lock Joint for the Saginaw-Midland Water Supply Commission, deadweight eliminated by the use of prestressed pipe totalled nearly 50,000 tons.

In production of the pipe, economy results from the lesser tonnage of steel required, although this saving is not in direct proportion to the reduction in weight because of the greater cost per ton of the lighter gage sheets and high-tensile wire. In respect to delivery of pipe, the elimination of so much deadweight results in direct saving in transportation and handling costs; particularly is this true where carloads of pipe must be transported long dis-

# CONCRETE PIPE SAVES STEEL

coating has cured, the pipe is ready for delivery.

The wire used in producing this pipe is oil tempered, high carbon, spring steel wire varying in tensile limit from 192,000 to 200,000 psi. Tension winding puts a compressive stress on the cylinder and concrete

When water pressure builds up inside the pipe, the compressive stress in the concrete is proportionately reduced, but conditions of design require that even at normal working pressure some residual compression be retained in the core. Thus, while operating under varied degrees of compression depending on the internal pressure to which it is subjected, the concrete core assumes elastic qualities from the compressive stress induced by the spring steel wire reinforcing.

Conventional concrete pressure pipe is reinforced with circular hotrolled rods of semi-finished steel. Pipe of this construction can be designed to withstand the same pressures as prestressed concrete cylinsure as that provided by a lighter gage steel cylinder reinforced by the far lighter high-tensile steel wire.

The saving in steel works out tonnage-wise as follows: For every ton of sheet steel used in the production of conventionally reinforced concrete pressure pipe, approximately two tons of hot rolled reinforcing rods are required. In the production of prestressed concrete cylinder pipe, for every ton of sheet steel required, approximately one-half ton of high-tensile reinforcing wire is needed.

Although the interior core of a prestressed concrete cylinder pipe is heavier than that of a conventionally reinforced concrete pressure pipe, the exterior wall is far lighter. In the 48-inch pipe previously mentioned, the total wall thickness of concrete for the conventional concrete pressure pipe would be 5 inches, whereas the combined concrete core and mortar coating of the prestressed pipe would be 3% inches. This in itself is a large savinches. This in itself is a large savinches.





 TOP, how pipe is wound; below, laying the Saginaw-Midland line. Pre-stressed pipe was used on this job.

tances from permanent plants to the eventual installation site. In respect to installation of the pipe, the lighter weight prestressed pipe permits the use of lighter equipment and proportionate savings in time and fuel.

A high resistance to external loads results from the combined tension in the spring steel wire and resultant compression in the concrete core of prestressed concrete cylinder pipe. This also provides higher resistance to beamload than does conventional reinforcing design.

The highest pressure for which prestressed concrete cylinder pipe has been built by Lock Joint to date is 300 pounds psi. The largest diameter of this type of construction is the 69-inch water supply line built for Rio de Janeiro, Brazil, and the smallest diameter is 12", used in the construction of several supply lines in the Dominican Republic.

# RELAYING OIL-MIX SURFACES MECHANICALLY



LOADER and portable breaker pick up scarified material and process it for re-use on the road.



 MOTOR grader blades the processed material to a smooth surface preparatory to final finish.

R ECONDITIONING of old gravel and oil-mix surfaces by modern equipment, with a minimum of labor, was demonstrated near Harrisburg, Ill., recently. The equipment used included an Athey force-feed loader with a portable breaker attached and a Caterpillar diesel motor grader. The procedures followed and the results of the work are reported as follows:

The first job consisted of scarifying and resurfacing a 400-ft. long section of gravel road. After scarifying, the motor grader bladed the scarified material into windrows. These were picked up by the loader and passed through the portable breaker which was mounted on a trailer and towed by the loader. These units were followed by the motor grader which bladed the crushed material to a smooth surface. On this job, average oversize of the gravel was 4 ins., and fines averaged about 80%. The roadbed

was scarified 10 ft. wide to a depth of 6 ins. The material was bladed into two windrows, having a total content of nearly 100 tons. Total working time on the 400-ft. section to scarify, windrow, pick up and crush, and level was one hour and thirty-five minutes. On this short section, naturally, time was lost in making turns and in waiting for other equipment to finish.

A second demonstration, the same day, and with the same equipment, was made on a 450-ft. section of oilmix surfacing. The old black top was scarified to a width of 20 ft. and to a depth of 6 ins. with the motor grader. The grader then bladed the scarified material into three windrows averaging about 3 cubic ft. per lineal foot. These windrows were picked up with the force-feed loader and passed through the portable breaker. The motor grader then spread the material evenly over the road; a shot of road oil was applied;

the material was again windrowed for thorough mixing, and then spread, using the motor grader. On this job the average oversize was  $3\frac{1}{2}$  ins. and fines were about 65%. The old surface was badly pitted, with numerous chuck-holes. The entire 450-ft. section was reconstructed, in the manner described above, in just under three and a half hours.

It is stated that the breaker used crushes all materials over one inch in its largest dimension. Most of the material smaller than 1-inch in size passes directly through the vibrating screen to the roadbed. Oversize passes to an impact mill. The use of such a breaker gives a desirable grading to the old surfacing material. On black-top surfaces it permits a saving by reducing the amount of bituminous material necessary to provide binding action, since advantage is taken of the original bituminous content.

## A Model FILTRATION

J. L. MORRISON

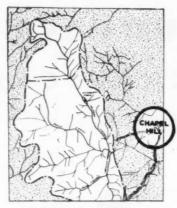
WHEN Chapel Hill, N. C., established the University Lake as its source of water supply some 25 years ago, engineers observed that more reservoir water was being lost by evaporation than was being consumed by the community. The extent to which conditions have changed is evident from the fact that the town's new \$838,000 water treatment plant was put into operation just in time to avert the worst local water shortage to date.

Chapel Hill is a university town with a population of 15,000 and it might seem strange for a town that size to require a plant with a capacity of 3 million gallons a day. Yet that is the nominal output of the new plant and, though it is expected to give the community an adequate supply of water for the foreseeable future, the plant was built in such a way as to be easily expandable. An unusual consumption experience is behind all this, for Chapel Hill's 15,000 consumers are using some 35,000,000 gallons a month.

It must be borne in mind that there is a student population of 7,000 in the town and that when the peaks of population and warm weather coincide, as they do in Chapel Hill in the months of May and October, there is a particularly heavy drain on the water supply. By working the old treatment plant 24 hours a day its capacity was increased to a maximum output of only 1,400,000 mgd, from 100,000 to 350,000 gallons behind the demand. Weekends, which saw a general student exodus, provided the only opportunity to refill the reservoirs. The situation was further complicated by the fire hazard inasmuch as the town often was left with less than a two-hour supply of water, too little for the control of any sizeable fire. Nor was the situation materially altered by the purchase last year of a war surplus portable plant with a filter capacity of 120,000 gallons a day.

#### The New Plant

The new treatment plant was designed by W. C. Olsen, consulting engineer of Raleigh, and is situated between the University Lake—source of the town's water—and the power plant which serves the town. A 15-acre tract of land was pur-



 DEPENDABLE yield of water is estimated at 6 MG daily.

chased as a site for the new treatment plant, a factor allowing for relatively inexpensive expansion in the future. One important economy effected in the plant's construction between the old plant and the lake is the use of existing pipe lines from the lake. These lines which originally carried raw water to the old plant now carry finished water to the distribution system; there are two 12-inch lines leaving the plant, one Transite and one cast iron.

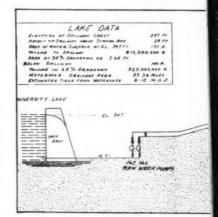
Another unusual feature Chapel Hill's new treatment plant is the fact that it is not furnished with standby equipment in the form of gasoline-powered auxiliary pumps. Such equipment was eliminated at a considerable savings because of Chapel Hill's multiple sources of power supply. The State of North Carolina operates all the utilities in Chapel Hill through the University administration and for many years the town's utility division has engaged the service of the Duke Power Company on a standby basis. It is hardly conceivable, therefore, that the filtration plant's power could be cut off completely, because the Duke Power Company facilities are ready in an emergency with all the multiple cross-connections available to a major utility. All this, of course, is in addition to Chapel Hill's own State-owned power plant.

Filters in the new water treatment plant can be filled with water from any of the settling basins, a switching arrangement which has its advantages when it becomes necessary to clean the filters at a time of peak demand. There are three filters in the plant, each with a nominal capacity of 1 mgd, a total output of 3 mgd. Equipment was furnished by Builders-Providence of Providence, R. I., including filter control equipment and remote level indicators. Wheeler bottoms are features of the plant's filters and the plant also uses Palmer filter sweeps. The filters contain 27 inches of sand and 12 inches of gravel.

#### Treatment Procedures

From the initial step in the mixing chamber, the raw lake water passes into a flocculator basin equipped with three sets of twopaddle Dorr flocculators. And here is another instance of looking to the future, for the flocculator equipment is designed for a capacity of 6 mgd rather than the current 3 mgd. That figure of 6 mgd, incidentally, is the estimated dependable yield of water available to Chapel Hill daily from its watershed. That watershed extends over 33 square miles of land whose waters drain into the University Lake. The lake itself has an estimated volume of some 600,000,000

Under normal conditions, mixing time in the Chapel Hill plant's basins is 45 minutes and settling time is 5 hours. Later, after the water has been processed through the filters, it is passed into the plant's clear



• Profile through the Chapel Hill supply, purification and

## PLANT for a Problem Town

water storage basin whose capacity is 1,500,000 gallons and which represents a full day's supply as against the three or four hours' supply of the old plant. A sight well equipped with a light is available in order to sight-check the filtered water passing into the reservoir or into the town's distribution system.

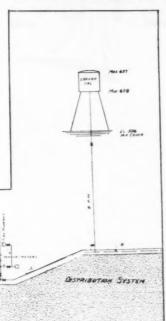
Three high-lift pumps with a total capacity of 8 mgd are a feature of the new plant. All of the pumps were furnished by the Morris Machine Company. There are two raw water pumps at the lake with a total capacity of 6 mgd. These lift the lake water 160 feet to the filtration plant. The plant also has one wash water pump which operates at \$,000 gallons per minute.

The top floor of the plant's building is given over to storage of alum, lime and carbon, with segregated storage for carbon which is usually messy. The problem of keeping the plant neat is largely solved by providing for the loading of chemicals from this storage room directly into the chemical dry feed equipment, which was furnished by Omega.

Public relations is a factor which has been taken into account in the construction of the Chapel Hill plant. For one thing, the entry is on the second floor and this makes it possible for visitors to pass by the working quarters of the plant



 PLANT building. Note the second-story main entrance and the young trees which mark start of a landscaping program.



distribution system, showing the lake and dam at the extreme left, pumping station, filter plant, storage and distribution.

personnel. This is in contrast to practice in many plants where visitors enter at the pumping level and never see anybody at work, thereby receiving an erroneous impression. The Chapel Hill plant employs a chemist and two operators.

Another public relations factor was taken into consideration when it was decided to have green as the predominant color of the building's interior. It was felt that this would achieve greater eye-appeal than the more somber colors usually encountered in filtration plants. A comprehensive program of beautification via landscaping has gotten underway at the new plant and a good-size parking lot is available for visitors. Furthermore, laboratory space is being prepared for students in the University's Department of Sanitary Engineering, which is headed by Dr. H. G. Baity.

Now that the bulk of Chapel Hill's water problems have been solved, there remains a secondary problem which is going to put the administration's public relations policy to a real test. The fact is that the town's only elevated storage tank, with a capacity of 250,000 gallons is painfully inadequate. More elevated storage is badly needed. Finding a site near enough to the distribution system to avoid the costly installation of new lines promises to be a tough nut to crack. Still, Chapel Hill's recurrent water shortages have been ended and the town's engineers believe the worst is over.

## Lansing RENTS GARBAGE CANS



S OME years ago the City of Lansing, Mich., installed a system of garbage removal which has been unusually successful, according to Glenn P. Manz, Director of Public Service and City Engineer.

The city purchased many thousands of standard-sized cans and rents them to householders. A medium-sized can rents for \$3 a year, payable by the 15th of May, with a 50¢ discount if payment is made by the due date. This is based on one collection a week, excepting during very warm weather when service is doubled. Commercial establishments may have as many as six pick-ups a week if they wish. The cost for this service is \$7.50 a year with a discount for prompt payment. These amounts include cost of the container which, of course, remains the property of the

Lansing insists that every householder and business establishment use city containers to the exclusion of all others. Only kitchen refuse is collected in this manner. Non-burnable garbage is collected by another system and is used for filling in swamp land.

One of the main reasons for installing this system was that the City of Lansing believes that garbage cans are a source of infection and that they should be sterilized. So when a filled can is picked up it is replaced by a sterilized one at once. Standard-size cans allow the use of a mechanical can washer, whereas odd-sized cans would disrupt the washing process. Standard-sized containers also stack more easily on city trucks than would odd-shaped cans. So it was essential that the city start this method of refuse collection by installing its own cans.

#### **Violators are Fined**

Lansing trucks call at regular times and containers are picked up from the rear of homes. It is against the law to place any inorganic refuse in these cans as the garbage is placed in digestion tanks at the sewage treatment plant and this results in thousands of cubic feet of gas a day which is used for heat and power. The city has the authority to fine any person who does not use city containers or who puts inorganic material in the refuse tin. However, this fine has never been

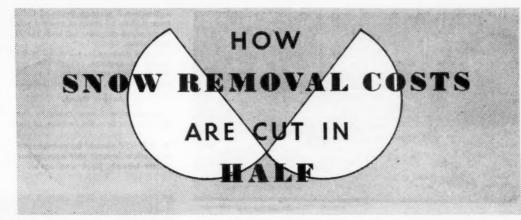
 EVERY home gets a sterilized garbage can when the filled can is picked up.

assessed in the 35 years the plan has been in operation. "We have had very good cooperation" reports Mr. Manz, "and it is unnecessary for us to resort to such drastic action."

#### The Manhole that Wasn't There

When a report came to the San Francisco Bureau of Sewer Repair of a crack in the center of Octavia St. between Vallejo and Green Sts., a crew was sent to examine what appeared to be a routine matter. The crew lifted the manhole cover near the crack and were greatly surprised to find no manhole-only a cavity. The office was notified and the Assistant Superintendent went to the scene to find a cavern 203 ft. long and about 12 ft. wide and deep, with the manhole lying a short distance from the manhole opening. Barricades were erected and the street closed to traffic.

Investigation indicated that the break had probably occurred some time previously in a 16-inch sewer which had been laid in 1892. The stream of sewage had washed away the sand which must have entered the Green St. sewer, but no record was found of any more than routine cleaning of this sewer. In some cases, the broken pipe had been carried for a considerable distance. The street is on a 10.91% grade, is 68.75 ft. wide, has 15-ft. sidewalks and is paved with a 14-ft brick center strip on a concrete base, with side strips of asphalt also on a concrete base. The pavement had held up so well that no breaks had occurred although the ground under the brick center strip was washed away. A new 15-inch sewer was laid, sand backfill was placed through holes cut in the pavement where necessary, bracing being used to support the pavement prior to filling. Flooding was used for final compaction.



A CCORDING to a survey made by the Bureau of Public Roads, it costs almost twice as much today to maintain streets and highways as it did 10 years ago. Specifically, the Bureau declares that the present day dollar buys only 56 cents worth of maintenance, in terms of the 1940 dollar. Stated another way, it now takes \$784 per mile to perform the same amount of over-all, year-round maintenance (snow and ice removal, grading, repairs, etc.) that could be performed in 1940 for \$436 per mile.

In an effort to close the gap between available revenue and rising costs, engineers and superintendents have turned increasingly to greater mechanization, newer and faster maintenance equipment, higher operating efficiency, and more efficient materials.

#### Reducing Snow and Ice Costs

Comparative cost studies show that in the field of snow and ice removal, for example, several cities and counties have succeeded in cutting their costs in half, vet at the same time they give faster and better snow and ice removal service than before. In the main, these men rely heavily on the more efficient plows, snow loaders and similar equipment now available, on short wave radio on plows and trucks, on an organization that goes to work at the first sign of snow or sleet, and on rock salt to remove light snow falls and ice and to keep heavy falls from packing and freezing until they can be plowed.

Cost figures show that the application of straight rock salt rather than rock salt and abrasives, or plain abrasives, makes possible one of the largest single savings in snow and ice removal budgets, and for that reason it is the accepted method of fast, low cost, and complete snow

#### ROBERT DEARDORFF

and ice removal in many communities. A truck load of rock salt covers at least 5 times as much street surface as a truck load of abrasives, which makes for a large saving in application time and labor and equipment costs. And, unilke abrasives, repeated applications are generally not necessary during the average storm, since rock salt removes snow and ice, instead of merely covering them up and then being covered in turn by additional snow fall; during most storms one application of rock salt is generally sufficient. Finally, rock salt doesn't have to be cleaned up after a storm, and it helps to keep catch basins from freezing instead of clogging them. For these reasons, many commissioners who use it instead of abrasives reduce their snow removal budgets by approximately 50%.

F. Ray Williams, Superintendent of Highways in Saratoga County, N. Y., for example, was able to do that when the county switched from sand treated with rock salt to rock salt alone. Cost records kept before and after the change show that the sand-treated mixture cost \$7.59 per mile of highway, including the cost of material and of application. Rock salt used alone, however, cost only \$3.32 per mile—a saving of \$4.27 per mile. Since Superintendent Williams covers 216 miles of highway during every storm, the use of

straight rock salt saves \$922.32 for the county every time the snow removal trucks go out. Scotchman salt spreaders are used.

In Rochester, N. Y., Commissioner Edward F. Nier discovered substantially the same thing. His cost records show that when Rochester used a mixture of rock salt and cinders during the 1947-48 winter, it cost \$9.30 to put down a mile of the saltcinder mixture, and another \$1.50 a mile to clean the cinders out of basins and receivers in the spring, making a total of \$10.80 per mile. Last winter Rochester used straight rock salt and the cost of snow and ice removal dropped to \$5.38 a mile. making it possible for the city to save \$5.42 per mile, or \$2,005.40 per storm

In many communities comparable savings, plus economies produced by increased mechanization and the use of modern plows and leaders, have enabled commissioners to provide safer, cleaner streets along which traffic can move at all times and to do it in spite of the reduced purchasing power of today's dollar.



 MODERN rock salt spreading equipment has reduced snow and ice removal costs materially.



Courtesy International Harvester

LOCATING
DESIGNING,
AND OPERATING

## S A N I T A R Y L A N D F I L L S

This article is based on data issued by C. W. Klassen, Chief Sanitary Engineer, Illinois Department of Health. Though it refers primarily to Illinois conditions, we believe it will be broadly useful in planning such installations.

THE sanitary landfill method of garbage and refuse disposal is relatively new in Illinois. Therefore, it is impossible to indicate all of the operational methods or anticipate all of the advantages that may be derived from these installations. These data are an attempt to evaluate present sanitary landfill knowledge as it applies to Illinois. They are not presented as rules, regulations, or minimum standards, but as items that must be considered if the installation is to be successful. Plans are necessary to coordinate the various factors involved. They

should be prepared by competent professional engineers. It is difficult or impossible to correct basic defects, once operation is started; it is much easier to prevent operating troubles by careful planning in the initial stages.

#### Design Bases

The usual production of garbage and refuse is 2 to 3 pounds per person per day. One ton of garbage and refuse will occupy from 1 to 2 cubic yards when compacted, compaction usually reducing the waste to 20% to 35% of its original volume. It is much preferable to determine these design factors on the basis of actual garbage and other refuse measurements, with compaction tests to determine the actual design factors. Such tests should be made on an adequate quantity of refuse. The figures given here are considered ample for most conditions.

On these bases, one cubic yard of compacted material may be expected per person per year. With a compacted garbage depth of 6 ft., from 0.75 to 1.5 acres of ground will be required per year for each 10,000 population.

For garbage only, allow 0.3 to 0.7 pound of garbage per person per day for cities and 0.6 to 0.9 pound per person per day for institutions.

#### Access Roads

In planning access roads to the fill, consider first the location of the

 REFUSE should be compacted in shallow layers; this equipment can trench, pack and cover.



fill and the consequent length of haul. Long hauls may be costly because of time lost and expenses of vehicle operation. These costs should be computed before selecting the site. The roads must be adequate for the traffic volume; must be capable of withstanding the wheel loads of the garbage and refuse handling vehicles; must be capable of use under wet-weather and snow conditions; and should be free from traffic hazards (or special precautions and safety measures provided).

#### Underground and Surface Pollution

Limestone strata may have solution channels or crevices through which pollution may travel. Sanitary landfills should not be located on rock strata without studying the hazards involved. A minimum of 30 ft. of clayey till overburden should be kept between the rock strata and the fill unless studies indicate a lesser depth is satisfactory. Drift wells should not be nearer than 500

ft. to any landfill unless studies indicate that subsurface seepage will not occur. Garbage and refuse must not be placed in mines or similar places where resulting seepage or leachate may carry to water-bearing strata or wells. Chemical pollution from a fill may carry long distances underground as compared to organic and pollutional travel. The State Water Survey, State Geological Survey and the State Sanitary Engineer should be consulted in regard to these problems.

Surface drainage should be provided to keep runoff to and into the fill at a minimum, and to prevent



#### COMPACTION to one-third of original volume, or less, gives best results in a sanitary fill.

puddles and ponds from forming on or adjacent to the fill. A sand-filled drainage trench should be placed at the toe of the fill in soils where fill drainage is not absorbed readily.

Mineral and bacteriological studies should be maintained on wells near sanitary fill operations. This will not be of much help, if pollution occurs, but will provide a warning. Seepage from sanitary landfills has shown strengths ranging from 170 to 5,900 ppm BOD; coliform organisms to 9,500 per ml; total bacterial counts to 33,000; nitrogen and ammonias to 62 ppm; and iron to 52 ppm. Inflammable gas may seep from fills. Sewers and water mains should not pass through fill material. Structures should not be located on fills unless precautions are taken to prevent gas seepage at such points, and consideration given to settlement possibili-

#### **Other Factors**

Surface drainage should also prevent concentrations of runoff water that may cause erosion or washing of fill cover or fill materials. Ponding and undue seepage into the fill should be avoided. The fill should not be located at a site subject to flooding, unless adequate protection is provided.

Provision should be made for additional cover, regrading, seeding, grassed waterways and other facilities to assure permanent stability of the fill site after completion of the fill. The slope of the fill surface should be a minimum of 1% to assure drainage; recognized slope factors, depending on final usage of the area, should be used. Allowance should be made for settlement; 20% to 25% has been reported in a 2-year period in some cases; over half occurred in the first six months. Regrading and filling of cracks should be performed as necessary.

#### Operation of the Fill

Equipment may be any of the following: Track-type tractor with bullclam or front-end loader; bulldozer and dragline; carryall scraper and pulldozer: bulldozer and trucks to haul in dirt; and other combinations, depending on local conditions. Unloading roads should be weatherproof, or facilities such as planks or airplane landing strip mats should be used. Bumper logs should be prolavers not over 12 ins. deep; the compacted depth of a single lift should not exceed 8 ft. A snow fence or a netting of chicken wire should be placed, according to the prevailing winds, to catch blowing papers. Scavenging should not be allowed except under rigid controls, if at all. The fill should be closed at the end of the day. A large container, tight and vermin proof, should be provided in which individuals can deposit material after hours, if such service is considered desirable or necessary. This can be removed to the fill in the morning.

Personnel should be provided to operate the equipment, keep records and keep the site clean. A portable house for personnel, tools and maintenance equipment is most desirable. Fire fighting facilities should be available. Periodic inspections should be made to assure that operation is adequate, and that rats, flies and mosquitoes do not exist. Temporary control measures should be provided if operation has been so lax as to permit these nuisances.

For winter operation, provide a stockpile of cover material; cover the area to be excavated during cold weather with leaves or other material to reduce freezing penetration; use snow fences to protect access roads; and consider the effects of prolonged periods of wet weather.

A properly constructed sanitary landfill may be used later for a rec-

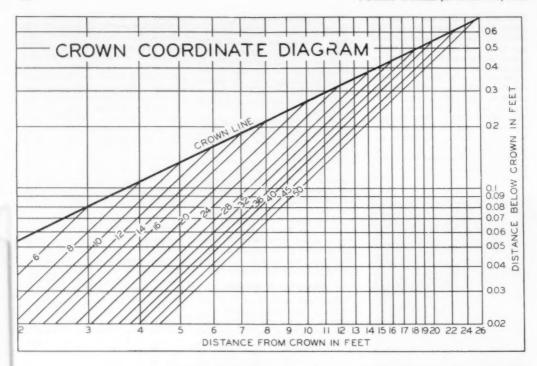


#### COVER should be at least 2 ft. thick and well compacted, and surface of fill should have at least a 1% slope for drainage.

vided when dumping over an edge or into a trench. Suitable road material, free from putrescible material, should be stockpiled for ready use in stabilizing such areas.

Refuse should be compacted in

reation area, for parking areas, for farmland reclamation, or for an air field, factory sites or for golf courses. A properly planned and operated landfill may be an asset to the community in many ways.



## GRAPHICAL DESIGN OF

THIS summer the City of Coldwater was faced with the construction of a number of paved streets, all of which were provided with curb and gutter. Since all of these curbs had been laid in old established residential areas, it was necessary to match the curb grades, more or less, with the sidewalks. This situation created but few places where the design of the crown of the streets could be based on a symmetrical cross section, and much of the actual design work had to be done in the field for the purpose of establishing finish grades for manholes, checking gravel sub-grades, etc. This is a simple problem in the case of symmetrical streets, but is not too readily handled when there is any appreciable difference in the elevation of the opposite curbs.

To supply a rapid yet accurate method of determining the crown coordinates at any point on a street of any width, as well as the location of the crown with respect to the curb line on streets with any difference in curb elevation, the Crown Coordinate Diagram and the Crown Offset Diagram illustrated here were devised. Simply constructed and

DAVID WEAGE
Engineering Ass't., City of Coldwater, Mich.

easily read, they save the time required for their construction many times over.

For the solution of symmetrical streets, the Crown Coordinate Diagram only is required. For example, if a street 32 feet in width is under consideration, the diagram shows a total crown of 0.43 feet at the intersection of the line marked "crown" and the diagonal line labeled "32." Equally easy is the determination of the difference in elevation of a point, say 5 feet, from the center of the street. The diagram is entered vertically at a point five feet from the crown and crosses the 32 line 0.041 feet below the crown.

If there is a difference in elevation in the curb levels, recourse is made first to the Crown Offset Diagram. As a sample problem take the case of a street 25 feet wide with a difference in curb elevation of 0.35 feet. Entering the diagram horizontally at 0.35 shows the intersection of this line with the 25 diagonal to be at a point 6 feet from the high side of the street, thereby establishing the location of the crown. This point, then, would be 19 feet from the low side of the street.

Transferring again to the Crown Coordinate Diagram and entering it at a point six feet from the crown, thence proceeding vertically to the "crown" line, the crown is shown to be 0.16 feet above the high side of the street. Then, proceeding downward to the left on the diagonal for a 12-foot street, one-half of which is equivalent to the high side of the asymmetrical street, the distance below the crown may be determined for any point between the high side and the crown. For the low side of the street the same procedure is followed upon entering the diagram vertically at a point 19 feet from the

#### Steps in Constructing Diagrams

To construct the diagrams the first problem is to determine the amount of crown for a street of any given width. There are many rules for calculating this, all of which are arbitrary, but have met wide acceptance by engineers. Many of these, such as the "Rosewater rule," are straight line functions which, when plotted on coordinate paper, cross the origin of the axes at zero. Therefore it becomes necessary to calculate the total crown of but one width of street; the remainder may be graphically determined by drawing a straight line through the ordinates of that particular street and the zero point. In the case of these particular diagrams no calculation was made for this, the selection of the crown having been made on the basis of satisfactory performance on already existing streets, and a rough check made to establish its conformance with accepted practices.

The line as established above is now transferred to the Crown Coordinate Diagram, which is based on a logarithmic scale, and appears as the line marked "crown." Theoretically this should appear as a curved line, but if a number of points are plotted on the logarithmic paper, it will be seen that since the gradient of the curve is so small a maximum error of perhaps 0.003 feet

This article illustrates and describes a quick and simple method of designing street crowns where one curb is higher than the other. The Crown Coordinate Diagram can also be used for symmetrical streets; and for determining the elevation of any point on the street cross-section. The text explains just how to construct similar diagrams for your own use. By making them larger it is possible to avoid interpolation.

The Crown Offset Diagram, shown below, establishes the position of the crown where curb elevations are different. Then, by use of the Crown Coordinate Diagram, the cross-section on each side of the off-center crown may be determined.

#### The Crown Offset Diagram

The Crown Offset Diagram requires the use of ordinary cross section paper of a suitable scale, and requires no calculation. Only one

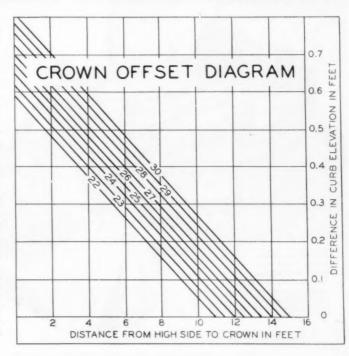
diagonal need be determined; the remainder are then ruled parallel to the first. This, too, is perhaps best explained by an example. Consider a street 26 feet wide. If this street were symmetrical, with a zero difference in curb elevation, its distance from one side to the crown would be half its width or thirteen feet. Thus the lower end of the line is established on the thirteen foot marker. The maximum difference in curb elevations permissible on this design basis is equivalent to the total crown of a street twice the width of the one under construction. This would produce a street having the crown at the extreme edge. The total crown of a street 52 feet in width then is shown by the Crown Coordinate Diagram to be 0.70 feet. This establishes the upper end of the 26 foot diagonal and the slope of all remaining lines on the diagram.

Both these charts are readily extended to any required range by the simple expedient of ruling additional parallel lines to cover the design in question. Their versatility is readily appreciated, and their accuracy is well within the limits required in practical application.

## **ASYMMETRIC STREET CROWNS**

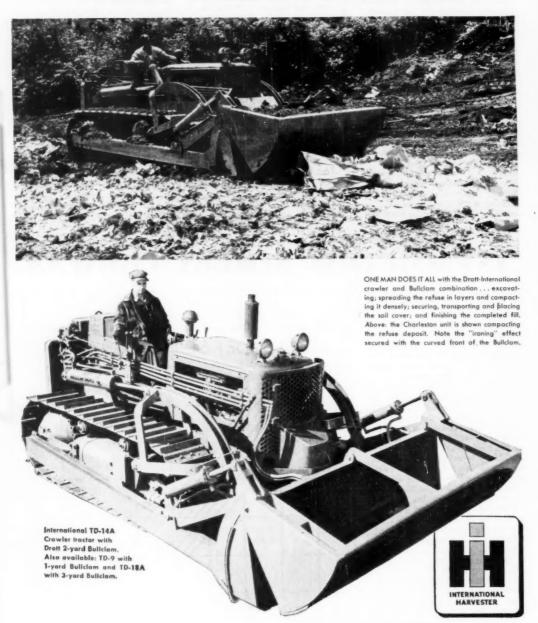
will be incurred if it is assumed to be a straight line. This amount is negligible in practice.

The remainder of the Crown Coordinate Diagram requires but one additional calculation for its completion. This is to determine the slope of the diagonal lines representing a family of parabolas on a logarithmic chart. As a sample, a street 32 feet wide might be selected. The diagram at this stage of its completion shows the total crown at the center (fifteen feet from the edge) to be 0.43 feet. By substituting these values in the formula for a parabola,  $y = cx^2$ , the value for the constant is determined. This value is, in turn, used to calculate another point on the 32 foot street. These two points now determine the slope of the line for the street in question, as well as the slopes of the lines representing streets of any width within the desired range. It now remains merely to rule parallel lines on the diagram with their upper ends starting at the intersection of the crown line and the vertical line representing half the width of the street. The diagram is now complete. and ready for design use.



# This ONE-MAN

### SAVED CHARLESTON'S CASH



When you need special information-consult READERS' SERVICE DEPT. on pages 85-89.

# Sanitary Fill Builder



On city-owned property across the street from the Bigley Avenue Playground, Charleston, W. Va., they "dumped and buried" 12,000 tons

of garbage and waste material in 20 weeks.

"Savings in time" as the result of putting an International TD-14A crawler and Drott Bullclam on this sanitary-fill job, "have enabled garbage collectors to increase weekly domestic collections by one-third," according to Mayor Andrews of that city.

#### **Actual Cash Savings**

"Actual cash savings of the operation have enabled the city to extend its garbage collection to the 18th Ward without adding a cent to the incinerator department budget," the mayor continues. "Where trucks had to wait more than an hour at the incincerator to dispose of garbage loads, dumping at the landfill is accomplished in only a few minutes."

#### **Residents Approve System**

"Instead of residents objecting to garbage dumping on a lot within the city, the department has on file requests from land owners for the city to use their property in filling low-lying land," the mayor asserts.

Savings of cash and time, ending of unsanitary and offensive disposal methods, make the Drott-International sanitary fill program of inestimable value to any community. Ask your International Industrial Power Distributor for the interesting facts on sanitary fill methods, or write to Drott Manufacturing Corporation, Milwaukee 8, Wisconsin, for literature.

DROTT MANUFACTURING CORPORATION
Milwaukee

INTERNATIONAL HARVESTER COMPANY
Chicago



Clearing brush and removing topsoil for later use as cover, is the first step in Sanitary Fill construction at St. Albans, W. Va.



Spreading the deposited waste in even layers, and compacting it, is an easy task for the tractor and Bullclam at Charleston



Finishing and grading the completed fill is the final step. Result: new, valuable raised-level land, as shown here, at San Angelo, Texas

# DROTT-INTERNATIONAL TRACTOR AND BULLCLAM COMBINATION

When writing, we will appreciate your mentioning PUBLIC WORKS

### FACTORS





# FILTRATION

T. R. KOMLINE

Komline-Sanderson Engrg. Corp.

at the rate of 0.20 to 0.25 gpm per square foot of filter area (with normal chemical dosage), but sufficient leeway should be provided (1) to allow for lower dewatering rates with small chemical dosages if this procedure is found desirable; while (2) at the same time, insuring sufficient extra capacity to provide for lessening of the individual bucket capacity due to grease deposits. The top of the elevator should have a hinged opening at least 18" square for easy access to the buckets.

Conditioning tank capacity is calculated on basis of 1 gallon per square foot of filter area, which gives a mixing time of four to five minutes. With floor-mounted filters, the conditioning tanks can be set close to the floor, simply allowing enough clearance under the tank for a 6-inch drain valve. Tanks should be fabricated of mild steel plate, 5/16" minimum thickness, provided with an overflow weir and with a 10-inch freeboard. The mixing device should be overhead, with no stuffing boxes. Removable cypress pickets are best, with variable speed drive, ranging from 6 to 18 strokes per minute to provide maximum flexibility.

Lime mixers and elevators are intended to prepare a lime slurry of uniform strength, and to apply this slurry to the sludge in correct proportions. Because of the characteristics of the lime slurry a bucket elevator is the most desirable means for carrying and metering the material. The buckets should be made of molded, soft, rubber so that any lime build-up or scale in the buckets can be easily broken up. An adequate access door should be provided in the elevator housing. Use of this system permits the lime to be stored on a lower level, remote from the filters, and the slurry is then applied to the sludge under de-

TION
of Sludge
the rate of 0.20 to 0.25 gpm per quare foot of filter area (with nor-

N all sewage treatment plants the solids deposited in the sedimentation basins form a sludge which may be handled in the raw state or submitted to a digestion period. The problem, in either case, is to concentrate this material into such form that it may be used (1) directly as fertilizer base; (2) heat dried and or incinerated, where a more attractive product is desired; (3) incinerated; or (4) disposed of eco-nomically. The first two schemes are generally associated with digested sludge: the third is used in connection with raw sludge and the fourth is broadly applicable. In the smaller plants the use of digesters is largely a matter of operating convenience: in the larger plants (serving over 100,000 population) the trend appears to be towards direct dewatering of the raw sludge coupled with incineration; but the final criterion should be one strictly of economics coupled with a possible desire to return the sludge to the

In addition to the sludge filter a number of auxiliaries are required. It is necessary to (1) get the wet sludge to the filter in a properly conditioned state; (2) provide means for handling the dewatered cake, (3) provide space, and on larger installations, foolproof and dependable handling and metering facilities for the chemicals to be utilized in conditioning the sludge for dewatering.

#### **Data on Auxiliaries**

Bucket elevators should be kept outside of the sludge sump, with galvanized housing constructed of <sup>1</sup>4" structural plate, water-tight below the maximum sump level, and adequately stiffened. Chain speed should be conservative. The capacity figure is determined by the fact that conditioned sludge will dewater

pendable conditions. The lime demand should be based on a dosage up to 15% on a dry solids basis. In order to maintain a constant slurry density, a 30-gallon water batching tank should be incorporated in the mixer. Thus, the operator can dump a bag of lime in the mixer along with the contents of the batching tank, and laboratory control becomes an actual reality in this difficult phase of the operation. Considerable thought should be given to the handling of the dry

The ferric chloride system is often the weak point in the filter layout. While the most expensive, the best system is to introduce the solution overhead by means of a Egyptian water wheel type feeder, working in combination with a feed tank and circulating pump, which may be located downstairs.

Vacuum receivers and moisture traps should be of sectional construction, mild steel plate, 5/16" minimum thickness.

Vacuum pumps should be figured on a basis of 2 cfm capacity per square foot of filter area, at 20 inches of mercury. The actual operating vacuum will vary with the cracking of the cake as it loses moisture during the dewatering cycle. We prefer the use of rotary pumps, of the wet vacuum type, but the power requirements on the larger units are greater than for the reciprocating dry vacuum pumps. On a 1,000 cfm pump, operating at 20" Hg., a Nash unit will require 60 hp, as against 50 hp for the dry type pump. It should be noted, however, that sewage sludge dewatering installations of this type rarely operate at 20" Hg., 6" to 15" being the rule. The penalty for the use of the wet type pump is then not as severe.

Filtrate pumps should be of the self-priming type, closely figured as to maximum capacity requirements.

The belt conveyor should be of the troughing type, wide enough to convey the cake from the filter without spillage; 14-inch is the narrowest width that will accomplish this, and it is probably just as well to go to 18-inch. The belt supports should be mounted on the floor, where the whole unit is completely accessible for lubrication and checkup. Troughing and return idler pulleys should be not less than 5" in diameter; troughing idler spacing not more than 4 ft. 6 ins. on centers, except for loading points, where the spacing should not exceed 2 ft. 6 ins., and return idlers should be located on 10-ft. centers.



### SMALL WATER TREATMENT PLANT



A new water treatment plant has been constructed for Clear Lake, Ia., one of the popular summer resorts of that state. With an estimated resident population of 4,200, the summer population may exceed 10,000. Consequently, the plant is designed to treat 1 million gallons a day, even though this provides oversize capacity for much of the year.

Water is drawn from Clear Lake through a 12-inch line and is aerated; chlorinated to give a free chlorine residual; coagulated and settled; filtered; and post-chlorinated. The effluent from the filters can be passed direct to the clear well or through an activated carbon filter, which is desirable during hot weather periods. Pressure sand filters from the old treatment plant were reconditioned to serve as the activated carbon filters. Provision is also made for the use of silica as a coagulant aid. The rate of chemical application is automatically controlled by the volume of water flowing to the treatment unit.

The Stanley Engineering Co., Muscatine, Iowa, were consultants on this job. Equipment used in the plant included the following:

There are three high service pumps, a Peerless 700 gpm against a head of 230 ft., is equipped with a 60-hp Crocker-Wheeler motor: a Dean Hill 750-gpm pump, relocated from the old plant, has a 50-hp GE motor, operating against a design head of 130 ft.; a Peerless, 650-gpm against 170 ft. head, is a standby pump, and is driven by an International U-9 gasoline engine.

The low lift pumps include two Peerless 700-gpm against a 55-ft. head, with Crocker-Wheeler 15 hp motors. The sludge sump pump is a Deming 100-gpm, 20-ft. head, with an Automatic Controls float switch. The wash water pump is a Peerless 1,440-gpm at 42-ft. head, with 20-hp. Crocker-Wheeler motor. The surface wash pump is a Peerless, 60-gpm at 100 ft., with Crocker-Wheeler 5 hp motor. All pumps have Allen Bradley starters.

The lime feeder is Infilco, with a Syntron vibrator; the mixer is a Lightning, Model L, Mixing Equipment Co.; the activated carbon feeder is Infilco, with the same type

of mixer; the alum feeder is also Infilco. The silica feed pump is Milton Roy, with a one-third hp GE explosion-proof motor; the silica feeder is Mixing Equipment Co. There are two W & T chlorinators, which were relocated from the old plant.

#### Chemical Feeders and Treatment Units

The clarifier is equipped with Infilco Accelator mechanism, and the aerator is an Infilco multicone. There are three filters, with anthrafilt filtering medium and Wagner type underdrain blocks. The manifold is 10-inch Transite and the laterals are 2-inch Transite with 11/32-inch orifices on the under side. The filters are equipped with Palmer type surface wash. The gages, operating tables, filter rate controllers and the clear well level gage are all Infilco. The raw water meters and the high service meter are Builders chronoflo telemetric, and the recording pressure gage is Foxboro. In the laboratory is a 6-unit laboratory stirrer made by Mixing Equipment Co.

## STEP BY STEP

#### E. R. HANNA

Road Commissioner, San Benito Co., Calif.

OR building a suitable low cost bituminous surface, we have used the procedure given below, and the following equipment: A tractor and sheepsfoot roller; two motor graders; seven 3-yd. dump trucks; a 3/4-vd. shovel; a tractor loader; four spreader boxes; a 1,200-gal. water truck; a 5-8-ton tandem roller; a drag broom; a 1,000-gal, hot oil distributor; and a 5,000-gal. hot oil transport tank.

The steps in procedure and the equipment necessary for each are as follows:

Step No. 1.-Equipment required includes two motor graders and the tractor and sheepsfoot roller. Scarify the old oil-mix or gravel surface with the motor graders and spread it for compaction and breaking up with the sheepsfoot roller. The material should be spread to the full width and shape of the finished section. If possible, all material should be broken down to 21/2-inch minus.

Step No. 2.- Equipment required: Two motor graders, water tank truck, power shovel, sheepsfoot roller and required number of trucks. Haul, dump and spread the 21/2-inch minus base material, using the graders for spreading to full cross-section; compact this new material with the sheepsfoot and finish with an iron roller, 8 tons minimum.

Step No. 3.-Equipment for this step will be the same as for Step 2. If base material is fine, so that a smooth and uniform surface results from Step 2, Step 3 will not be necessary. Otherwise, haul and spread fine crushed base rock, 1/2-inch minus, sufficient to give a minimum thickness of 34 inch. Spread with graders, water to a slurry, spread and roll to a slick tight surface.

Step No. 4.-Equipment: 5,000-gal. oil transport truck and 1,000-gal. distributor. When the surface as finished above has dried out so that it is just slightly damp, apply SC-1

#### PROCEDURES IN

## BUILDING LOW COST

## BITUMINOUS

prime at the rate of 0.20 to 0.33 gal. per sq. yd. The precise amount depends on the condition of the surface and the weather. Hot weather and a porous surface will readily demand 0.33 gal.; cool weather and a hard impervious surface will absorb considerably less. All of the oil must be absorbed before Step No. 5 is undertaken. Close the road to traffic for several hours following the application of the oil so that traffic will not pick up the priming oil.

Step No. 5.-Equipment: 5,000-gal. oil transport truck, 1,000-gal. dis-tributor, front end loader, four or more dump trucks equipped with tailgate spreaders (we prefer trough type extending across tailgate of truck to insure a uniform blanket of material); drag broom; and 8-ton

With sand or dust blot (very lightly) any slick or fat spots on the prime oil. Then apply 0.25 to 0.33 gal. per sq. yd. of SC-6 bituminous binder (very hot, about 400° F.). Cover oil immediately with 20 to 35 pounds per sq. yd. of crushed rock screenings. We prefer ½-inch maximum, No. 8 minimum, but we have various sizes (1/2" to 1/4", 1/4" to No.

## SURFACES

8, %" to No. 6, etc.) and all have been very satisfactory. Screenings are applied by backing over the hot oil and spreading uniformly through the spreader boxes. Immediately after spreading, the surface is rolled once, then dragged with a light broom behind a pickup truck, then rolled again and opened to traffic.

This type of surface is ironed out and slicked up by traffic; the more traffic in the first 24 hours, the better, for it whips surplus screenings off the surface and bonds he surface tightly. Of course, this type of road is only as good as its base; but with a good base, such a surface will handle up to 500 cars daily for years; and when the traffic becomes too heavy for it, it makes an ideal base for machine laid plant mix; or it can be torn up and resurfaced.

When the wea her is very hot all day and warm at night, we have had good luck using MC-5 oil in place of the SC-6, and using river run sand, 1/2-inch minus. This is generally cheaper and will handle traffic up to 200 cars daily.



MOTOR grader is only one of the several pieces of equipment required for building first-class low-cost surfaces.

## Banish Garbage Worries Forever!



In most communities garbage

In most communities garbage collection is a headache... and a costly headache at that. But, it needn't be. The Hotpoint Municipal Plan of Garbage Removal disposes of your garbage collection worries right along with the garbage!

The Hotpoint Municipal Plan provides a method of garbage disposal which eliminates the need for garbage cans, garbage trucks or a garbage collection budget.

A complete, factual presentation of the Hotpoint Municipal Plan, based on experience and written specifically for municipal officials, is available for your study. This plan is being presented at the request of municipal governing bodies all over the country. We shall be happy to present it to you.

#### Your community will welcome the opportunity to enjoy:

- A convenient, new and modern garbage removal system
- Health protection to the members of all families.
- Fly and rat pest reduction.
- · Garbage collection cost reduction.
- · More digestion gas for use and sale.
- Elimination of food waste before it becomes garbage.
- Elimination of alley garbage can.
- · Elimination of garbage collection problems.
- Elimination of garbage odors.
- True sanitation for your town.

The Hotpoint Disposaile garbage disposer, is easy to install
in any sink... convenient... safe
ple to operate... keeps kitchens,
sinks and hands clean. Does not
can also be used with septic tank.

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And—it saves you money!

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Title

## **NEW ENGINEERING PROJECTS**

#### Reported by Consulting Engineers

#### **Sewerage and Sanitation**

B IDS will be called late this year on a 6 mgd sewage treatment plant for Chippewa Falls, Wisc., from plans prepared by Banister Engrg. Co., St. Paul, Minn. Additions to the sewerage system of Tupelo, Miss., to cost about \$575,000 and sewage treatment works for the same city to cost \$290,000 have been designed by Leland B. Cook consulting engineer of Tupelo. Couch & Kulin, Indianapolis, Ind., have designed sewage treatment plants for Booneville, Ind., and Beech Grove, Ind., the latter job including sewer construction. The Booneville job is estimated at \$300,000 and the Beech Grove work at \$500,000. Ralph Delaney, consulting engineer of Ada, Okla., reports the following jobs: Sewage treatment and sewer extensions for Ada, probable cost \$920,000; water lines, sewer extensions and sewage treatment for Madill, Okla., probable cost \$200.000; sewage treatment for Weleetka, Okla., bond issue \$76,844; sewage treatment, sewer extensions and water mains for Kenawa, Okla., \$67,650; and sewage treatment and sewer system for Davenport, Okla., about \$50,000.

Gannett Fleming Corddry & Carpenter, Inc., Harrisburg, Pa., are engineers on intercepting sewers and sewage disposal for McKeesport, Pa., approximate cost \$3,000,000. Hasie & Green Engrg. Co., Lubbock, Texas, have designed a sewer project for Stanton, Tex., estimated cost \$125,000. Johnson, Depp & Quisenberry, Owensboro, Ky., were engineers on sewer and sewage pumping station construction for Providence. Ky. R. F. MacDowell & Associates, Cleveland, O., are engineers for Berea, O., the work involving doubling treatment plant capacity. Arthur S. Mannes, consulting engineer, Aberdeen, S. D., let the contract in the early summer for a new sewer system at Pierpont, S. D.; and has prepared plans for remodeling and enlarging the treatment plants at Redfield and Webster, both S. D.

Last spring, George Mebus, consulting engineer of Glenside, Pa., started work on the sewage treatment and water supply for the Eastern State Penitentiary Gratersford, Pa. Parker & Hill of Seattle, Wash., received bids in the early summer for sewers and a sewage treatment plant for Wilbur, Wash. Perkins & McWayne, Architects and Engineers, Sioux Falls, S. D., designed and supervised the construction of a sewer system and treatment for Elkton, S. D. Boyd E. Phelps, Inc., Michigan City, Ind., will ask for bids next year on sewers and a sewage treatment plant for Jeffersonville, Ind., estimated cost \$1,200,000. Paul Uhlmann & Associates, Columbus, O., are engineers on the construction of sewage treatment plant improvements for Lebanon, O., probable cost \$120,000. Virginia Engrg. Co., Virginia, Minn., are engineers for the sewage treatment plant for Biwabik, Minn.

Newman E. Argraves & Associates, New Haven, Conn., were engineers for sewer system construction in Middletown, Conn. Finkbeiner, Pettis & Strout, Toledo. O., are engineers for intercepting sewers and a sewage treatment plant for North Baltimore, O. Work reported by Clarke Gardner & Associates, Salisbury, Md., include a 3.6 mgd sewage treatment plant for Salisbury; intercepting sewers for Salisbury; a booster pumping station at Lewes, Del.; and drain construction at Fruitland, Md. Garrett Engrg. Co., Houston, Tex., designed storm drainage for Hearne, Tex., the work being performed by force account. Mallett & Associates, Jackson, Miss., are engineers on the \$625,000 sewerage outfall being constructed for Jackson. K. E. Rector, Topeka, Kans., was consulting engineer on a 21-mile sewer system for Topeka Township.

Bids will be called early in 1951 for constructing a sewage treatment plant and intercepting sewers for Rice Lake, Wisc.; the engineering work is being done by Davy Engrg. Co., LaCrosse, Wisc. Other projects handled by Davy Engrg. Co. include intercepting sewers and treatment plants for Darlington, Washburn, Bayfield and Alma; and water

supply improvements for Wabasha, Minn., and Eleva, Wisc. Finkbeiner, Pettis & Strout, Toledo, O., are engineers for sewers in Bryan and Wayne, and water supply in Norwalk, O. O'Shea & Peck, Fort Smith, Ark., are engineers for treatment plant improvements for Paris, Ark.

The job of revamping the sewer system and the treatment plant for Hibbing, Minn., is being handled by Banister Engrg. Co., St. Paul. Briley-Wild Associates, Daytona Beach, Fla., are designing extensions and improvements to the Clearwater, Fla., sewer system and will enlarge the treatment plant; estimated cost is \$850,000. The same engineers are handling the water and sewage improvements for Eustis. Floyd G. Browne & Associates, Marion, O., will call for bids early in 1951 for storm sewers for Delphos. O. James G. Cooney, Belleville, Ill., is acting as engineer for water and sewerage improvements for Smithon, Lenzburg, Albion and Sparta. Carleton Robb, former paratrooper, recently awarded a BSCE has joined Mr. Cooney's organization.

Marion L. Crist & Associates, Little Rock, Ark., are handling sewer extensions and sewage treatment at Mena, Ark., estimated cost \$165,000; at Osceola, Ark., \$215,000; Rogers, Ark., \$200,000; and Dyersburg, Tenn., \$500,000. Finkbeiner, Pettis & Strout, Toledo, are engineers for sewerage and sewage treatment for Woodville, O. W. E. Johnson, Jackson, Miss., is engineer for sewers, sewage treatment and water improvements for Brookhaven, Miss., estimated cost \$900,000. Rollin F. MacDowell & Associates, Cleveland, are designing sewers, pumping stations and a treatment plant for Toronto, O. Pfeiffer & Shultz, Minneapolis, Minn., have made a study of treatment requirements for Jackson, Minn. Last year a similar study was completed for Windom, upstream from Jackson, and the design of the plants for the two communities will be handled as one overall river problem.

Ripple & Howe, Denver, Colo., designed a complete new sewer system and treatment plant for Stratton, Colo. Troy E. Watford, consulting engineer of Gadsden, Ala., has designed additional sewer



Packing more power into a smaller unit, and offering a number of advanced features, this new 700 Series is designed to meet the space-economy-reliability standards of electric power generator drive, pumping service on oil or gas pipe line, municipal water pumping service, and other stationary power applications. Available with 6 and 8 cylinders in capacities from 700 to 2080 hp, the new engines are four-cycle, 17-in. bore, 20-in. stroke, with speeds of 257 to 375 rpm. Modern welded construction of bed-plate, frame and cylinder housing substantially reduces power-weight-size ratios. Interesting features include:



Cylinder liners have integrally-cast water jackets, eliminating internal water seals. Cooling water is carried above top piston ring for maximum cooling efficiency.



Open-type combustion chamber, incorporated in top of piston, assures exceptionallly smooth operation on any fuel oil, and permits application of supercharging equipment if required.



Each cylinder is served by an individual fuelinjection pump, with spring-loaded, multi-hole type injectors.



Positive displacement lubricating oil pump gives pressured flow of oil to moving parts. Motor driven lube-oil pump for priming and cooling engine after operation.

These merely suggest the array of benefits offered by the new 700 series. More than two years of performance tests and field service have confirmed the efficiency and economy of these newest Baldwins, which carry on the traditions established by the original DeLaVergne Line—the oldest, best known name in Diesels. Send for bulletin 320.

The Baldwin Locomotive Works, Philadelphia 42, Pa., U.S.A., Offices: Chicago, Cleveland, Houston, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Washington. In Canada: Peacock Bros., Ltd., Montreal, Quebec.



**BALDWIN** 

DIESEL

facilities for Gadsden to cost about \$750,000. He also is engineer for street paving in Gadsden; sewers and additional water plant work for Centre, Ala.; a water system for Rainbow, Ala.; sewers for Glencoe, Ala.: and a highway bridge over the Coosa River at Gadsden.

McClendon & Associates, Corpus Christi, Tex., are engineers for a disposal plant for a school district near Corpus Christi. Russell & Axon, St. Louis, Mo., are designing a sewage treatment plant for Poplar Bluff, Mo., sanitary sewer extensions for the same city, sewerage facilities for Chaffee, Mo., and water

extensions for Sikeston, Mo. Ralph L. Woolpert Co., Dayton, O., has completed a report on sewers and sewage treatment for Troy, O. A complete activated sludge plant for Valparaiso, Ind., has been designed by O. M. Leonard & Associates, Michigan City, Ind. A. P. Noyes, consulting engineer, Kilgore, Tex., is engineer on the design of a treatment plant for Kilgore, Tex.

#### Streets, Roads, Bridges & Airports

Koch & Fowler, Dallas, Tex., are engineers on a county road improvement program for

County, which will cost about \$22,-500,000 and will be built in progressive units. Kenneth H. Larden & Associates, Kansas City, Mo., are engineers on paving and a sewage treatment plant for Sabetha, Kans. Patchen & Zimmerman, Augusta, Ga., are engineers for the relocation of highways and railroads, including 9 bridges, around Bugg Island dam. Reynolds, Smith & Hills, Jacksonville, Fla., will let bids this fall on street paving to cost \$800,000 for North Miami, Fla.

R. F. Pyle, consulting engineer of Newport News, Va., is engineer for storm and sanitary sewers, water mains and street paving, including curbs and gutter, for a housing development near Newport News. Harold Hoskins & Associates, Lincoln, Nebr., are engineers on \$160,-000 Federal Aid repaving at Kearney: additional paving at Hemingford; and water works improvements at Grand Junction, Iowa.

L. P. Pelishek Engrg. Co., Clintonville, Wisc., is engineer for street improvements, including bridge reconstruction, in Clintonville.

#### **Water Supply**

S TERILIZATION of a 1 mg reservoir and adjacent mains was recently carried out at Lyons, Ill., by Chlorination Specialists, Chicago, Ill.; this and a job at Cicero, Ill., are among the many jobs of this type handled. Dakota Engrg. Co., Valley City, N. D., were engineers on water mains, sewers and a treatment plant for Columbus, N. D. Gannett Fleming Corddry & Carpenter, Harrisburg, Pa., are engineers on the earth fill dam on Beaver Run for the Westmoreland Co. Authority; estimated cost is \$2,000,000. Kenneth H. Larkin & Associates, Kansas City, Mo., report designing two swimming pools, one for Kansas City to cost \$150,000 and the other for Kinsley, Mo., to cost \$75,000. Clyde P. Mason, Lexington, Ky., designed a swimming pool for the Paris, Ky., Coun-

Merritt & Welker, Marietta, Ga., were engineers on the design of the extensions for the Cobb Co., Ga., water distribution system, which now has over 2,800 customers. Robert L. Streeter, Casper, Wyo., is consulting engineer for the water treatment plant for Thermopolis, Wyo. Francis Engrg. Co., Rockford, Ill., are engineers for the Village of Walnut to provide wells, mains and storage; also for a well, piping and pumping for Peru, Ill. R. D. Tillson, High Point, N. C., designed two swimming pools and bathhouses for Burlington, N. C.

(Continued on page 58)



#### Mahvalve AND FITTINGS COMPANY ANNISTON, ALABAMA

Our Mechanical Joint Valves, made to AWWA specifications, are furnished in sizes 2" to 30", and valves approved by Underwriters and Associated Factory Mutuals are furnished in sizes up to 12". Iron body, bronze mounted, double disc, parallel seat, hydrostatically tested at 350 lbs. for water working pressures of 175 to 200 pounds. Post indicator Valves with Mechanical Joint feature are available for use with indicator posts when valves are installed on underground pipe line to serve sprinkler system requiring Underwriters and Associated Factory Mutual's acceptance.

Mechanical Joint features are: Ease and speed of installation, construction economy, joint deflection, leak-tight, long life. Used with AWWA Class A, B, C, D; Federal Spec. WW-P-421; or Class 100, 150, 200, 250 centrifugal pipe.



Figure 82M



#### WRITE FOR CIRCULAR NO. 49

Our new Circular 49 gives important information and installation dimensions of M & H AWWA Mechanical Joint Valves and Hydrants . . . Underwriters and Factory Mutual approved Post Indicator Valves . . . and Cutting-In Sleeves.

## M&H Products · Everywhere

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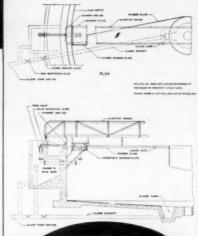


ODESSA, TEXAS, INSTALLATION OF INFILCO AUTOMATIC HYDRAULIC SKIMMER

# Controlled Currents Remove Scum this New and Better Way!

INFILCO'S Automatic Hydraulic Skimmer introduces a new principle in scum removal. Now, the use of controlled currents brings a new high degree of efficiency to the disposal of surface scum in primary clarifiers. The heart of the scum remover is the scum discharge pipe which fits into the center of the skimmer plate located just below the liquid surface. Here, controlled currents are set up to remove surface scum. Removal occurs automatically once during each revolution of the sludge scraper assembly.

WRITE TODAY for Bulletin No. S 6000. It gives all the interesting facts concerning this better scum remover. Also complete information about infileo's "quiescent clarification"... the ultimate in effective sedimentation and sludge removal.



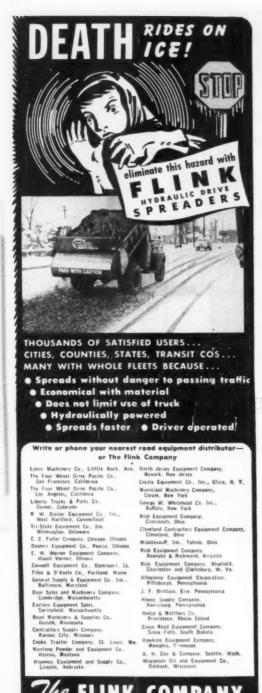
BETTER WATER CONDITIONING

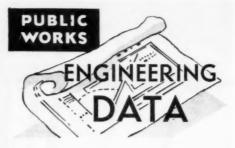
FILCO INC. AND WASTE TREATMENT SINCE

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WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING FOUIPMENT





#### Copper Sulfate for Root Control in Cincinnati

Experience with copper sulfate for root control, writes C. E. Brokaw, Sup't. of Highway Maintenance of Cincinnati, O., has been conducted on an experimental basis for a year. In this time "we have had considerable success in killing roots in sewer lines from six to eight inches in diameter; in larger sewers, copper sulfate has been of questionable value. This is probably due to the larger volume of flow which dilutes the sulfate below killing strength. We have also noted that control is not effective where the roots have entered the crown of the sewer; in such cases they were killed only to the flow line. Several months ago, we picked twenty sewer locations where root entrance has been a chronic problem, necessitating frequent periodic mechanical root removal. These sewers were treated with copper sulfate and are being checked at definite periods. The results of these tests will, in some measure, determine our future policy in the use of this chemical.'

## DDT Prevents Termites From Attacking Woodwork

A single treatment of DDT gives complete protection to wood in contact with soil for at least 5 years, the U. S. Department of Agriculture says. This is an easily applied termite prevention treatment anyone can make.

Experiments conducted for many years by entomof the Department's Bureau of Entomology and Plant Quarantine indicate that 5% DDT in No. 2 fuel oil gives a satisfactory answer to the termite problem. The insecticide is applied to the soil surrounding wooden structures needing protection at the rate of one quart per cubic foot of soil.

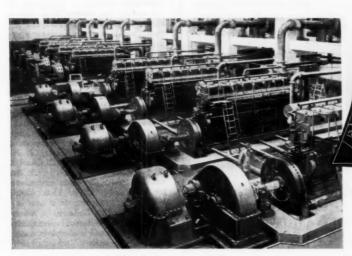
Of the hundreds of chemicals tested by the Bureau, DDT seems to suit the purpose best in a number of respects. The testing of DDT for termite control started in 1943, shortly after the chemical was developed for war-time use by Bureau scientists at their Orlando, Florida, laboratory. The formula has been effective against termites in the continuing experiments, and may remain so for a number of years. Further research is necessary to find out just how long DDT will continue as a barrier against termites. The entomologists still want to find out if DDT is better than sodium arsenite for this purpose. Sodium arsenite is a fairly cheap, highly effective, but extremely poisonous chemical.

Termite control is both easier and cheaper, the entomologists say, when control efforts are directed toward preventing them from getting into buildings, rather than killing them after they get in. DDT insecticide fits very well into this type of control method.

· STREATOR

## EXCEPTIONAL LOW POWER COST

for huge new Los Angeles sewage



Nine Supercharged, Dual Fuel Worthington Engines, of 1688 hp. each, installed at the new Hyperion Sewage Treatment Plant, Los Angeles, California

Now being built at a cost of approximately \$41 million, Los Angeles' new Hyperion sewage disposal plant will be the most modern and efficient in the world. Designed to handle an average daily flow of 245 million gallons of raw sewage, this modern "high-rate" plant will feature the most advanced engineering in every detail of operation.

Nine Worthington Dual Fuel engines are to be the entire power source. Five will drive generators, and the other four will drive blowers. The Hyperion plant will operate at exceptionally low cost, thanks to: (1) the Worthington-pioneered dual fuel principle, permitting the use of gas, oil, or gas and oil in any ratio; (2) supercharging, which provides maximum power for available space, and with the utilization of high-

temperature water cooling and exhaust heat recovery system, results in highest thermal efficiency.

#### SEWAGE GAS THE FUEL

These Worthington engines will normally run on raw sewage gas, utilizing pilot oil to ignite the gas. Fuel expenses under ordinary conditions, therefore, will be only the cost of pilot oil. However, should there ever be a shortage of sewage gas, the engines will automatically shift to oil fuel, in the necessary ratio. This gas-oil ratio can also be

Worthington
Supercharged
Dual Fuel Engines
to Supply 15,000 hp
...for only the
cost of pilot fuel!

disposal

plant

controlled manually.

#### FOR EVERY SIZE OF PLANT

In addition to Dual Fuel Engines, Worthington makes a wide range of Diesels, pumps, comminuters, and other equipment, to meet the requirements of sewage treatment plants of every size from the smallest to the largest. For further facts on the trouble-free, cost-saving engine performance that proves there's more worth in Worthington, write to Worthington Pump and Machinery Corporation, Engine Division, Buffalo, N. Y.

## WORTHINGTON



YOUR
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WORTHINGTON-BUILT AUXILIARIES

Dieael engines, 150 to 3,520 hp...gas engines, 175 to 3,520 hp...dual fuel engines, 225 to 3,290 hp.



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Oil Transfer Pumps

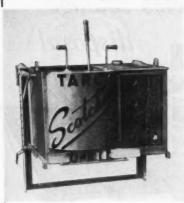


Cooling Water Circulating Pumps



Evaporative Type Engine Water Cooler

## YOU CAN SAVE



time money and lives IF you use a stainless steel "Scotchman" spreader and de-icing salts (no sand or cinders).

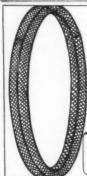
The "Scotchman" method of ICE and SNOW CONTROL is CHEAPER than sand or cinders. It is eight times FASTER. It keeps drainage open and provides CLEAN-BARE-SAFE pavements.



COMPLETE CONTROL: direction, width, and rate of spread WEATHER-PROOFED ENGINE ELECTRIC STARTER BAGGED or BULK SALT . USE on ANY TRUCK or PICK-UP

TARRANT MFG. CO.

JUMEL ST., SARATOGA SPRINGS, N. Y.



#### BACTERIA-FREE PACKING

One-Half the Cost of Braided Jute One-Quarter the Cost of Rubber Packing

MADE IN 34". 12". %" SIZES

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#### \$5.22 a ton for Asphalt is worth saving!

The Foote Kinetic Asphalt Mixer will give you 3 to 10 more batches from a barrel of asphalt. One user\* has re-ported savings of \$5.22 a ton. asphalt. One user's has re-ported savings of \$5.22 a ton. They used to buy their ma-terial for \$10.50 a ton. Now they make it with the Foots Kinetic Asphalt Mixer for \$5.28 a ton. \$5.22 a ton is worth saving! Such savings will soon pay for your Foots Kinetic Mixer.

Kinetic Mixer.
You cannot compare the
Foote Mixer with an ordinary
mixer either from roncrete mixer with an ordinar concrete mixer either from standpoint of construction of the finished product. Let us send you complete de-tails. Ask for Bulletin Subsidiary of Blow-Ress Co \*Name on request.



- · High output for low
- · Handles any mix
- Fully portable
- · New mixing principle gives you 8 to 10 more batches out of every barrel of asphalt



THE FOOTE CO., INC.

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When you need special information-consult READERS' SERVICE DEPT. on pages 85-89.

#### **New Engineering Projects** for Public Works

(Continued from page 54)

Water supply improvements for Prairie City, Ia., have been designed by F. H. Austin & H. C. Patterson, consulting engineers of Knoxville, Ia. Briley-Wild Associates, Daytona Beach, Fla., are the engineers on a city wide water supply project to cost about a million dollars for Hallandale, Fla. Darby, Bogner & Associates are the engineers for a 4 mgd filtration plant for Lake, Wisc., taking water from Lake Michigan, Martin A. Milling, Anderson, Ind., has designed a water softening plant for Arcadia, Ind.; also an addition to the Lapel, Ind., plant. A new water supply, filter plant and force main for Morganton. N. C., is being handled by J. N. Pease Co., Charlotte, N. C. Charles H. Sells, Inc., Pleasantville, N. Y., has designed water main extensions for Hawthorne, N. Y. A. R. Todd, Wheeling, O., reports on a new intake crib for the Bellaire, O., water works. J. B. Wilson, Indianapolis, Ind., has designed a complete water works for Francisco, Ind.

Briley-Wild Associates, Daytona Beach, Fla., have designed a treatment plant and distribution system for Port Orange, Fla. Marion L. Crist & Associates, Little Rock, Ark., are the engineers for water supply and distribution, sewer extensions and sewage treatment for Gurdon, Ark.; also for a well and distribution improvements for Magnolia, Ark. and for water and sewer improvements and sewage treatment for Prescott, Ark. H. R. Hunter, Wichita, Kans., is the engineer for waterworks, including a dam and a filtration plant for Spring Hill, Kans. J. Wilbur Irish, Peekskill, N. Y., is engineer for a water supply for the town of Cortlandt, Westchester Co., N. Y. Johnson, Depp & Quisenberry, Owensboro, Ky., are engineers for a new reservoir, pipeline and pumping station for Providence, Ky.

Rollin F. MacDowell & Associates, Cleveland, O., are engineers for a \$250,000 water improvement for Marblehead, O. Donald Mills, Selma, Ala., is the engineer for waterworks improvements for Bay Minette, Ala. Lee T. Purcell, Paterson, N. J., is handling waterworks improvements for Haledon and Pompton Lakes. N. J. Ripple & Howe, Denver, Colo., have designed a swimming pool for Pine Valley Club, Colorado Spgs., and waterworks improvements for Westminster, Colo.; also a settling basin, reservoir improvements and

pipe line for Montrose, Colo. Briley-Wild Associates, Daytona Beach, Fla., are engineers on the water supply and a swimming pool for Eustis, Fla., and on water improvements for Ormond Beach, Fla. A. P. Noyes, Kilgore, Texas, will call for bids about the first of the year for a complete new water supply for Kilgore. Clyde Mason, Lexington, Ky., is the engineer on the water distribution improvements for Wayland, Ky.

#### Other Work

G. A. Chaney & Associates, Chevy Chase, Md., have designed a yacht harbor for Carolina Beach, N. C. This will accommodate 78 boats up to 70 ft. long. John G. Doran, Madisonville, Ky., was engineer on the design of a coal washer and preparation plant for the Stony Point Coal Co. Mannes Engrg. Co., Aberdeen, S. D., made the survey and the profile sheets for a 170-mile power transmisison line for the Bureau of Reclamation. Boyd E. Phelps, Michigan City, Ind., designed a power plant to cost about \$500,000 for Kendallville, Ind. C. E. Stockman, Baker, Ore., planned the new street lighting system for Baker, using metal poles and mercury-vapor incandescent luminaires.

Newman E. Argraves & Associates, New Haven, Conn., have designed a steam electric generating plant for Norwich State Hospital, Norwich, Conn. Harold Hoskins & Associates, Inc., Lincoln, Nebr., were the engineers on street lighting for Wayne and Beatrice, Nebr. The electric light and power system for Caldwell, Tex., has been studied by Garrett Engrg. Co., Houston, Tex., covering existing facilities and desirable additions.

#### **Public Works Costs Lower**

John E. Hubel

R ECORDS of the city and county purchasing department in Milwaukee, Wisc., disclose that bids are lower than in 1949 on public works projects. Some street and sewer work is being done as much as 15% below the costs of a year ago, though the average is lower. The same is true of bids on concrete aprons, grading and other work at the Gen. Mitchell airport. In one case the engineers for the county had estimated \$1,046,000 for proposed work. The low bid was \$849,292, while the highest bidder on the project was below a million dollars.

According to city and county officials, labor and materials are higher than they were in former months, but there is more competition. The chief clerk of the Public Works Department said recently: "More contractors are bidding on jobs now than has been the case for several years, and the result is tighter competition than we have experienced since the end of the war." A contractor explains the lower bids on public works contracts by the fact that the workmen on the jobs had been inexperienced in the past, but now had learned how to cut down the time needed to do the various kinds of work; and, he added, that keen competition was also a factor.

The Director of Public Works for Milwaukee County, E. A. Howard, estimates the savings on contract work for park improvements to be 10% to 15% compared to the 1949 figures for the same kinds of work. Lloyd D. Knapp, city engineer and superintendent of sewers, estimates that costs have dropped from 5% to 10% in the past few months for sewer, street and alley work, as compared to 1949. In street construction, G. R. Anderson, engineer for



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street construction and repair, stated that costs for concrete paving had fallen slightly—from \$3.25 to \$3.21 per sq. yd.

Many of the principal streets in Milwaukee are now being repaved, with consequent replacement of water and sewer piping. This is being done while the streets are torn up, despite the fact that some of the piping still has many years of useful life. Only one side of the street is torn up at a time to avoid undue interference with traffic. It is probable that the street car tracks will not be relaid, as a movement is

on foot to replace street cars with diesel or gas buses; however, since the wires are available, trackless trolley type buses may be used.

#### Recommendations for Disaster Planning

FOLLOWING the explosion at South Amboy, N. J., earlier this year, the New Jersey Department of Health sent three special teams to that city to aid in rehabilitation. One team of two engineers was charged with water and sewerage work; another team of a public health physician, veterinarian,

pharmacist and two engineers was charged with policy in regard to mass immunizations, impounding contamined foodstuffs and boiling of water; a third team of two physicians, a clinical psychologist and two nurses was charged with determining the adequacy of the public health, medical and nursing emergency measures applied.

In the report prepared by these teams, the following recommendations were made:

a. That adequate preplanning be done locally and at the State level to prevent unnecessary delay or confusion in case of future disaster, large or small. This should include a specific pre-determined person who would be in command at a specific site. A deputy and an alternate site are indicated to cover injury or death to the first in command and serious damage to primary headquarters.

b. Adequate plans of both water systems and sewerage systems should be locally available and copies of such plans should be on file in the office of the State Department of Health, so that remedies for emergency conditions can be quickly planned and executed.

c. It must be clearly recognized in the planning for the future that:

(1) An atomic bomb explosion would give a very much greater blast effect and that, in addition, there would be both radiant heat and radiation damage of very serious proportions. Falling debris and fire would add to the problems.

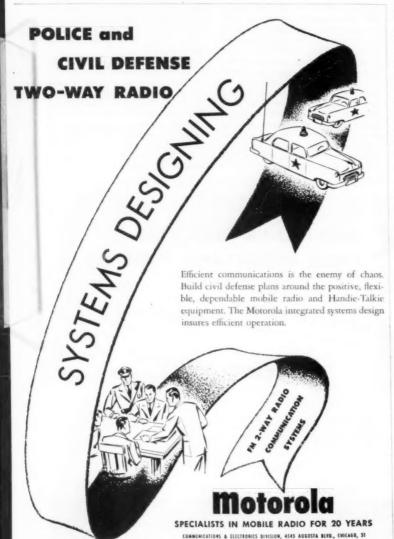
(2) An atomic bomb explosion in the same spot would have destroyed the limited local hospital facilities and killed or injured most of the local medical and nursing personnel, and would have destroyed churches, schools, first-aid stations, houses, stores, local medical supplies, food and other resources.

(3) An atomic bomb explosion might not be single, would probably mean war and the Army and Coast Guard, etc., would be too busy with their own problems to help a civilian group.

d. The planning must be on an area basis with intercommunity, intercounty and possibly for some items on an interstate basis.

e. Rigid, practical standards must be adopted and enforced.

f. The location of storage of supplies and the items to be so stored must be related to the predetermined standards and plans, including those for the pre-determined treatment of burns and radiation sickness on a mass scale.



When you need special information-consult READERS' SERVICE DEPT. on pages 85-89.

# PUBLIC

# WORKS

HIS section digests and briefs the important articles appearing in the periodicals that reached this office prior to the 15th of the previous month. Appended are Bibliographies of all principal articles in these publications.

WATER WORKS...

HIGHWAYS AND AIRPORTS...

SEWERAGE AND REFUSE...

#### THE WATER WORKS DIGEST

#### Yield from Storage Reservoirs

The streams of the country are being increasingly developed for municipal and industrial water supplies, carrying off wastes, power generation and irrigation. There is no current evidence that the streams cannot supply all the development which prudent design, based on adequate data and competent analyses, might demonstrate to be feasible, but the situation should be watched carefully. C. G. Paulsen.

In examining facts concerning long-term changes in surface water supplies in the East, one can fairly conclude that the continuous instrumental observations of precipitation and temperature are of too short duration to substantiate any shift in the basic climate. The detailed interpretation of the older instrumental records is clouded in part by inconsistencies in techniques and conditions of observation. They suggest, however, that the basic climate along the East Coast, although fluctuating, has remained much the same since at least 1800. Records of stream flow, available since only 1863, do not show any general overall trends of variation in absolute volumes of flow. However, in recent years stream flow has shown a slight relative lowering with respect to climatic factors. W. B. Langbein.

Siltation of reservoirs is a serious problem. At some reservoirs on highly sedimentary streams, as much storage space must be allowed for the probable deposit of sediment in 20 or 30 years as is required for the volume of water necessarily stored. The principal factors affecting siltation in reservoirs are 1-the amount and character of sediment carried by the stream; 2-the size of the drainage area; 3-the tendency of the reservoir to capture sediment; and 4-the design of the project with regard to minimizing sediment deposits. Recent studies indicate that the silt carried at a particular place is very much less per square mile on large watersheds than on small ones. Methods of minimizing silting include silt diversion, side storage, desilting basins, and watershed control. Charles B. Bur-

New York City, in computing the storage needed, allows a reserve of 25% to provide for a possible period drier than any experienced in the past; to allow for silting; to provide for that quantity of storage which is unavailable at full aqueduct delivery because of hydraulic conditions; and in the event that the driest period should occur while the spring runoff is delayed. This 25% reserve is provided for New Jersey's Wanaque system also.

"Safe Yield from Surface Storage Reservoirs;" Journal, American Water Works Ass'n, September.

#### Delaying Iron Settlement

Miami, Fla. found it necessary in 1948-49 to draw part of its supply from wells, the water from which contained 0.5 to 0.9 ppm of iron, 240 ppm total hardness, and a temperature of 76° F. Motion of the water through the large mains was very slow, and to prevent deposits of iron in them, effort was made to so treat the water as to delay the settlement of iron.

The application of mono-, di- and trisodium phosphates, fluoride ion, polyphosphates added after chlorine, and polyphosphates in amounts less than four times the iron content of the water was devoid of effect. Larger amounts of polyphosphates gave some protection but produced objectionable amounts of turbidity. On a straight weight-forweight basis, sodium silicate, as SiOz, is rather more effective than the polyphosphates. No turbidity is produced. A silica sol, activated sodium silicate, produced by the neutralization of sodium silicate by carbon dioxide is approximately twice as effective as sodium silicate.

Clarence R. Henry-"Prevention of the Settlement of Iron;" Journal, American Water Works Ass'n, September.

#### **Water Systems** and Atomic Bombing

What a water department should be prepared to do in case of an atomic bomb explosion can not be known by experience, but a study of the effects of the Japanese explosions leads to certain general conclusions. It is now believed that there would be little danger of charging the water of a reservoir with radioactive substances unless an atomic bomb discharged beneath the surface of the water. For a considerable distance from an explosion, mains would be destroyed and the grounds so covered by debris that it would be impossible to locate valve boxes or even roadway limits. To prevent waste of the water supply, the water department forces should shut off the flow into the destroyed areas, at the same time trying to permit a continuance of flow to all areas where the pipes have not been destroyed, to fight fires. Therefore, all valves in the distribution system should now at once be put and maintained in the best possible working order, and their location well referenced so that they can be found quickly even if the valve box is covered by debris. As the telephone system will probably be out of commission, radio communication will probably be the only means available, and should be provided now. The water department should immediately inform the draft officials of what men are considered essential for safe waterworks operation. It is not believed that atomic bombs would be used on cities of under 50,000 population. These smaller cities and the larger ones near by could well work out plans by which the experienced men of the former could aid the latter in case of bombing.

"Are Water Systems Prepared for Atomic Bombs?"; Water Works Engineering, September.

#### Experiences With Fluoridation

Sheboygan, Wis., has completed 4 yr. of fluoride treatment, and dental surveys have been made of all

school children in the kindergartens and 7th, 8th, and 9th grades, each year since and one year before fluoridation. The 1949 survey showed a reduction from 4.8 DEF teeth in 1945 to 2.9 in 1949 per kindergarten child, and from 8.54 in 1942 to 7.0 in 1949 in the 7th, 8th and 9th grade children. The cost of fluoridation is paid from the health division of the city's general fund. Sodium fluoride is used, costing at present \$11.14 per 100 lb. bag, or \$2.12 per m.g. of water treated. The Div. of Industrial Hygiene of the Wisconsin Bd. of Health tested the air at the plant and found no conditions dangerous to the operators, but recommended that they wear masks while filling the hoppers, and that analyses of their urine for fluoride content be made every six months.

Madison, Wis., has adopted treatment of its water with fluorine at the rate of 1 ppm. Its supply is pumped from 8 wells directly into the distribution system, by electric pumps with no direct supervision. The use of fluorine in liquid form is therefore desirable, and 70% hydrofluoric acid is used. As no pump is commercially available for an acid of this type, the displacement method of dosing was adopted; Russian mineral oil (sp. gr. 0.9) is pumped into a tank of hydrofluoric acid at the rate of dosage and floats on and displaces the acid (sp. gr. 1.2). This acid causes severe burns if it comes into contact with human skin, and it is hazardous even to breathe the acid fumes; and those handling it wear masks and rubber coats, gloves and boots and are given a course of training. Also large exhaust fans have been provided for removing fumes. The cost of treatment is approximately 20¢ per person per year.

Jerome C. Zufelt and Leon A. Smith—"Experience With Fluoridation of Drinking Water;" Journal, American Water Works Ass'n, September.

#### Growths in California Mains

In California, the ground waters used for a considerable part of the public water supplies present more purification difficulties than the surface supplies, and more than most ground waters in other parts of the country. This is due to the fact that in the coastal area are subterranean peat beds 1,000 ft. or more deep, overlain with as much as 350 ft. depth of detritus deposited by numerous streams, some of it silica, some calcareous, iron, manganese.



sulfur and organic matter. At Beverly Hills are 22 wells within a radius of 3 miles, no two yielding identical waters. In some deposits, bacteria are so actively working as to produce sufficient methane to maintain a flame at the top of the well casing; also hydrogen sulfide is found. The most troublesome organisms are the Crenothrix and Gallionella fostered by iron and manganese waters. They invade the transmission and distribution systems and greatly reduce their carrying capacity-as much as 20% in the Hitch Hitchy tunnels. San Diego's conduit was reduced in capacity more than 10% by a heavy slime growth of saprophytic bacteria.

Slime growths at Santa Rosa were found to consist mostly of an amorphous substance characteristic of growths of slime-forming bacteria. These bacteria consume enormous amounts of oxygen.. Chlorine applied at 3.0 ppm, coupled with thorough flushing of the mains eliminated the slime, but caused iron and manganese precipitation and chlorinous tastes and odors. The precipitation was eliminated by applying sodium hexametaphosphate; but the odor remained, and dechlorination with sulfur dioxide was tried, together with discontinuance of the metaphosphate. But with no residual chlorine, the original condition returned, and at present metaphosphate is used and the sulfur dioxide discontinued. A slight chlorinous odor is generally apparent and occasional precipitation of iron and manganese.

At Glendale, Crenothrix growths almost completely filled the smaller pipes. Copper sulfate in doses of 1 ppm gave fairly good results. Further improvement was obtained with the use of sodium carbonate. Finally chlorination was tried and has proved successful in removing these

The well water at Torrance is devoid of oxygen, contains dissolved methane and a little sulfide, and shows a B.O.D. of 12 ppm which indicates a high load of organic matter. The sulfide was removed by aeration, which also supplied 3 ppm of oxygen, but the latter disappeared within 700 ft. flow in the mains. Swampy tastes and odors were frequent. Chlorination was adopted 8 vr. ago. The dosage is about 5 ppm and the residual as the water leaves the plant is about 0.3 ppm, which disappears within 1/4 mile. There is an oxygen utilization of 4 ppm, probably most of it due to oxidation of organic matter in the water.

Carl Wilson, Kenneth W. Brown, Richard Pomeroy and James M. Montgomery-"Control of Growths in California Distribution Systems;' Journal, American Water Works Ass'n, September.

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Prevention of the Settlement of Iron, By



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#### Plant Provides Hot Asphalt Mix in a Hurry

Lindsay F. Root

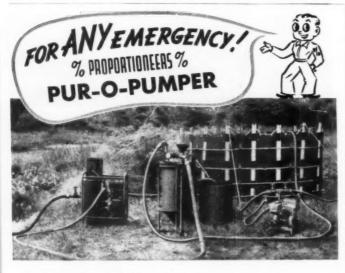
In the New Mexico Highway Journal

Hot plant oil mix is being used for the first time in a big way on the highways of New Mexico. A portable hot mix plant, the Pioneer Continuflo Model 101, was bought by the Tri-State Paving Co., which is composed of three of New Mexico's larger contracting companies: Skousen-Hise, Allison & Haney and Armstrong and Armstrong. Skousen-Hise Contracting Co. is the first user of the plant on a contract in the southern part of the State.

The job, which is 20.6 miles long. is on U.S. 70 and 80 between Deming and Lordsburg. The unit is set up at Separ, at the midway point, where there is a haul of one-half mile for the oil from the railroad spur, and a quarter-mile haul of aggregate from the material pit. The pit, incidentally, is one of the largest in New Mexico and will supply 200,-000 tons of material for the project.

The prevailing wind made it necessary for the contractor to assemble the components of the plant in a straight line instead of the "L" shape suggested by the manufacturer. The dust removal unit is placed at right angles to the remainder of the plant on the leeward side. The aggregate flows in a straight line from the stockpile, where it is bulldozed into the hopper of the belt conveyor, which carries it into the drier where the excess fines are removed.

The heated and dried material is lifted by bucket conveyor into the vibrator screens which separate the sizes. From the bins where the separated sizes are stored the material is fed into the twin pug mills



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where it is mixed with the carefully metered oil and ejected into the storage hopper at a rate of 125 tons an hour. The temperature of the mix at the hopper is between 285 and 300 degrees Fahrenheit.

Trucks carry the hot mix to the project, an average five-mile haul, where a Barber-Greene paver lays it on the prepared base at a rate of from 1100 to 1300 tons a day. The two twelve-foot widths are carefully joined, then the steel rollers take over for compaction.

One unusual element of this plant is the use of 50 weight motor oil for transmitting the heat from distillate to the asphalt in the 10,000 gallon storage tanks. A closed circuit conveys the heated oil to the tanks and return. The engineer in charge of the plant claims this to be the most satisfactory heating method he has worked with.

#### **Chlorinating Water Mains**

The Water Safety Control Section of Chicago's Department of Public Works has developed a method of chlorinating water mains in which a specially designed rotameter equipment is used. This can deliver chlorine at rates over a wide range of feed by regulating only two valves. It is believed by the section to be the most accurate and most efficient means yet developed for injecting chlorine into a water main. It is described by Howard R. Bruah, Junior Sanitary Engineer, Water Safety Control Section, as follows:

This equipment consists principally of a tapered glass tube which is calibrated in millimeters, a Hastaloy "C" metal rotor which rides on the gas column within the tube, and very accurate control valves on the inlet and outlet sides of the tube. Gauges are provided to indicate pressures at various points within the machines so that control may be very accurate. These gauges indicate tank pressure, operating pressure within the machine, and back pressure. With this setup, the gas is injected by tank pressure and, therefore, a heated water bath is used summer or winter to supply heat to the chlorine tank to maintain a high and constant operating pressure. The chlorine gas is metered accurately by this device and injected directly into the main with no intermediate water injection necessary.

"With an accurately calibrated rotameter and without the use of a scale, chlorine feeds may be maintained to an accuracy of within onehalf pound of chlorine per hour. We have rotameter units which are cap-

able of feeding as high as 200 lbs. of chlorine in one hour, although for field use we generaly use a 50-lb. per hour (maximum feed) machine. This rotameter is sufficiently large to inject chlorine at the proper rate into the largest mains in our system at the flushing rates available. By maintaining the proper operating pressure through heating the chlorine tanks in the water bath and setting the feed of the rotameter by proper valve manipulation, we can maintain a steady rate of feed of chlorine gas to the main throughout the entire chlorination procedure and thereby be sure that the proper dosage is contained in every gallon of water in the main to be treated.

"If for any reason tank pressure does fail, water cannot return to the chlorine tank to cause corrosion and tank wall failure. The gauges and rotor operation will warn the operator in ample time to close the rotometer valves and thereby prevent water from backing up through the machine to the tank. However, to prevent such an occurrence, a check valve is placed in the machine discharge line as an added safety precaution."



## PUBLIC WORKS

## DIGESTS

### THE HIGHWAY AND AIRPORT DIGEST

#### Street With Highway Cross-section

In laying out a development for low-cost houses at Bartlesville, Okla., the developer found that it would require two 36" pipe to carry off a normal 3" rainfall, which would add several hundred dollars to the cost of each house. Ordinary gutters would not carry the runoff from such rainfall, so a highway type of street was adopted, with a 20-ft. concrete pavement and two 20-ft. wide ditches, 1 ft. deep with 10:1 slopes. The private driveways are of concrete and follow the crosssection of the ditches, allowing the water to flow down the ditches freely and providing ditch checks to prevent erosion. The wide, shallow ditch reduces the water velocity and scouring. The ditches will be sodded or have a light asphalt and gravel

Don. V. Purington—"Economy Paving for New Subdivisions;" American City, September.

#### Heavy Runway For Berlin Airlift

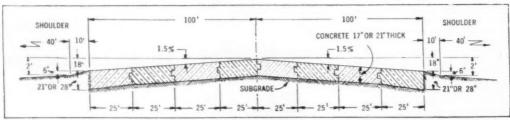
To carry the large aircraft used in the Berlin Airlift with a gross weight of 170,000 lb., a runway pavement was designed and constructed based on a single wheel load of 85,000 lb. Equipment was not available that would give the desired compaction of the soil, and the design was based on a subgrade modulus of 100 psi

per in. This, with a flexure strength of 600 psi, required 17" depth of concrete for the center section of the runway and 21" for taxiways, aprons, and 950 ft. at each end of the 7,000 ft. runway. Oil paper was placed between the ground and the concrete. The Germans had used, for their autobahn construction, very dry concrete, with only 4.2 gal. of water per sack of cement, laid in two layers. This was used on this runway, but with unsatisfactory results; and after a week was changed to 5 gal. per sack, and depositing the entire thickness in one layer. Highfrequency vibrators were used in the concrete, and for vibrating dummy-joint templates in place. A total of 150 test specimens were poured, flexure test beams showing an average modulus of rupture of 699 psi, and compression specimens averaging 4,770 psi at 28 days. The concrete was laid by German contractors, using German equipment. They poured 114,458 cu, vd. in 125

Willard C. Jensen—"Airlift Airfield gets Heavy Concrete Runway;" Civil Engineering, October.

#### Maintaining State Bridges in Missouri

For maintaining the bridges on its state highways, Missouri has an organization consisting of a bridge maintenance engineer, 2 assistants, 2 bridge repair crews of 8 or 10 men each, 2 sandblast and red-lead crews of 5 or 6 men, and 5 paint crews of 7 or 8 men. The bridge maintenance engineer or one of his assistants makes an inspection of all the bridges each year and decides what maintenance work is to be done. The maintenance crew paints bridges, constructs channel control works, repairs damaged structures, substructures and bridge floors. When paint on a steel bridge has so deteriorated that metal is exposed, the exposed spots are wire-brushed and scraped and spot-painted, red lead applied to cleaned areas and the whole bridge given a complete top coat of aluminum. Sandblasting is done with a 105 cfm compressor mounted on a 3-ton truck and operated through its take-off. The crew can sandblast and red lead about 20 tons of steel a day. A costly item of maintenance is channel control. This includes riprapping approach fills, constructing deflectors, tree retards etc. Many old bridges have timber floors and are too light to carry concrete ones. When these floors have to be replaced, laminated timber floors are used consisting of 2 x 4 or 2 x 6 pieces laid on edge, covered with a mat of asphalt and fine aggregate, renewed from time to time as needed. Concrete bridge floors, some of them 25 or 30 vr. old. have not deteriorated to any extent because of wear or weather. About a year ago a concrete floor that carries more than 2,000 vehicles a



Courtesy Civil Engineering

• TYPICAL cross section of new runway at Rhein-Main Airfield has construction joints 25 ft. apart. On center runway section, pavement thickness is 17 in., increased to 21 in. at outside edges. On taxiways, aprons, and 950-ft. length at each end of runway, pavement is 21 in. thick with edges 28 in. thick.

day was resurfaced with concrete having a minimum thickness of 1", being first sandblasted and soaked with water. This is still in excellent condition.

J. A. Williams—"Maintaining Structures on Missouri State Highways;" Better Roads, September.

#### Maintaining Asphalt Pavements

Cleveland, Ohio, has about 1200 miles of paved streets. The city maintains a major asphalt resurfacing crew and three general asphalt repair and utility opening crews. Also two gangs which raise manholes, valve boxes, etc., repair defective pavement base and construct approaches into intersections. Six crews repair brick block and concrete pavements, and utility openings. Two crews of 45 men each maintain and repair the 80 miles of dirt streets, each using two graders and a distributor. The major resurfacing crew has an asphalt construction foreman, 3 equipment operators, two roller men, and two operators for the Barber-Greene paving machine; 2 rakers, 5 tampers, 4 laborers and 3 watchmen. The city has a 600-ton per day asphalt plant; 11 to 14 trucks haul the asphalt mix, and a truck to move the fire wagon and generally serve the crew.

Allan E. Hinton—"Winter Maintenance in Cleveland;" PUBLIC WORKS, October.

#### Hay Mats For Erosion Control

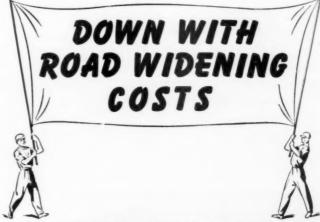
In the western part of the State of Washington the soil consists of clay and sandy loam and glacial till. With the high humidity and average yearly rainfalls exceeding 50", erosion of highway slopes in such soil is prevalent. The Highway Dept. has been very successful in controlling erosion by use of hay mats. These not only minimize erosion but act as a seeding and mulching agent, and the bare soil is made fertile by rapid bacterial action taking place under the protection of the mats. Ripe, rain-spoiled hay is used, costing about \$10 a ton; and as it contains 250 to 300 lb. of seed per ton, this alone is well worth the cost. The mats are intended as a means of establishing a grass cover. On slopes flatter than 2:1 the hay is not made into mats, but is spread and held in place with binder twine tied to pegs. Mats are made about 3 ft. wide and 20 ft. long, and are held in shape by two wires on the bottom, two directly above them on top, each top and bottom pair being tied together at 18" intervals. These

mats are placed longitudinally down the slope, and both top and bottom tied to pegs.

Sidney Walsh—"Hay Mats Control Erosion on Steep Slopes;" Better Roads, September.

### British Studies Of Soil Compaction

The British Road Research Laboratory, comparable to the U. S. Bureau of Public Roads, has studied compaction of a large range of typical soils by the different types of rollers and by "frog rammers" (heavy self-operated jumping rammers). It reports that pneumatictire rollers, if sufficiently loaded, perform satisfactorily on all types of soils. Smooth-wheel rollers are the most effective on granular soils, such as gravel and sand. A comparison of 5-ton club-foot and 41/2-ton taperfoot sheepsfoot rollers showed that the shape of the feet made little difference in the result obtained. Both were ineffective in compacting sand and less satisfactory than an 8-ton smooth-wheel roller on the gravelly soil. On the clay soils they performed well at lower moisture contents than those normally found.



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"No evidence was found for the widely held belief that sheepsfoot rollers compact from the bottom upwards." Greater depths of compaction were obtained with the frogrammer, two or three coverages giving 20" for the granular soils and 10" for the clay soils.

"British Investigation of Soil as Part of a Road Structure:" Roads and Engineering Construction, Sep-

tember.

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#### Research on Sulphur Compound Joint Materials

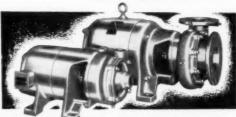
The Atlas Mineral Products Co., Mertztown, Pa., will continue its research project on the fundamentals of sulphur joint compounds. This project was set up over a year ago in response to a request by the American Water Works Association that a research program be undertaken to develop basic information on this subject. The project is under the supervision of Dr. Raymond B. Seymour, Technical Director, assisted by Dr. Robert H. Steiner, Research Coordinator, and Walter R. Pascoe, Research Chemist, Working with Atlas on this project are members of the Civil Engineering Department of Lehigh University under the direction of Prof. W. H. Eney and associates, Dr. A. C. Lower, Dr. R. D. Stout and Mr. K. Mulhausen.

#### Six Dual Fuel Diesels for Sewage Treatment Plant

Power for New York City's newest and largest sewage plant at Owl's Head Point, Brooklyn, will be supplied by six 1300-hp. Superior diesel engines. For economy of operation, the New York Depart-



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THE GORMAN-RUPP COMPANY MANSFIELD, OHIO

ment of Public Works has selected engines that will use either oil or sewage gas as fuel, or will run with both fuels together. Each engine will drive 900-kw. generators which will provide electric power for the new plant. Contamination of beaches will be greatly reduced by next season when the plant will be treating approximately one-sixth of New York's estimated billion gallons of sewage daily.

#### Sanitary Fill for Refuse Disposal

Grand Forks, North Dakota, recently adopted the sanitary-fill method of refuse disposal. For this purpose the city has acquired five acres of land near the city and it is expected that this area will handle wastes for four or five years. The operation of the sanitary-file is being carried out under the guidance of the state health department which has been operating an experimental sanitary-fill under cold water conditions for several years in another city. Public Management.

#### Special Trailers Help Highway Work

Trailer combinations have been designed by the New Mexico Highway Department to meet some of the problems in highway work in that state. These are specially designed for use by oiling crews, so that experienced oil men may be used on the various jobs rather than rely on pickup workers.

Each trailer unit consists of three trailers: One is a dormitory unit, one a kitchen and dining room, and one a combination office and wash room. The dormitory section contains five double deck bunks with 10 locked wardrobes built in. Each bunk is furnished with foam rubber mattress and pillow, and has a built in reading type light. The trailer ceiling contains five dome lights.

The second section has the kitchen with a double sink, hot and cold running water, storage cabinets, dish cabinets with access from both the dining room and kitchen, gas range, and gas refrigerator. The fittings and work benches are stainless steel covered. The dining room, which will also be used as a recreation room, will have seating space for the ten men at a long table. Metal covered benches will be provided.

The third unit contains an office space with built-in desk and accessories, and space for a standard filing cabinet. The mid portion of the trailer will have facilities for showers and wash basins. The 30-gallon gas water heater will be lo-

cated in this unit, with pipe connections to the kitchen unit. One end of this trailer will contain a five kilowatt generator with provision made for filling the gas tank of the motor from the outside.

The shells of all three sections are the same size and construction. Outside dimensions are 8' by 28' with a six-inch bumper at either end. The aluminum sheets are riveted to a steel frame, and the 1½-inch space between them is filled with a special insulating material, "Ultralite". There is no insulation in the floor, which is built of one inch plywood fastened to the steel frame.

The dormitory and dining unit will be air conditioned, and adequate heating units will be provided so that the units can be used in all sorts of weather.

Because much of the work of the oiling crew takes place in scantily populated areas there has existed for some time the need for units such as these. District engineers in all districts have asked for such accommodations. When they go into use, studies will be made for ways in which to improve the design, and it is hoped that enough units will be acquired to satisfy the need of all field crews.

## FEWER MAN POWER WORRIES THIS WINTER



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## PUBLIC WORKS

## DIGESTS

#### THE SEWERAGE AND REFUSE DIGEST

#### Household Garbage Grinders at Jasper, Ind.

Jasper, Ind., the first city to adopt household garbage grinding as a municipal process, is completing its program. It estimated the comparative costs of home grinding, central grinding and sanitary fill. The estimated monthly costs per family were: home grinders, 66 cts.; central grinding, 65 cts.; sanitary fill, 61 cts. The first two included \$40,000 and \$35,000, respectively, for increase in capacity of sewage treatment plant; \$82,500 for home grinders installed. The elimination of the garbage can was considered worth the slight additional cost of home grinding. An ordinance was passed requiring each home owner to provide his own garbage disposal facilities, and the installing of garbage grinders was made attractive.

Bids for furnishing grinders, and for both furnishing and installing, were received from 6 firms. The bids for furnishing grinders only varied from \$35.19 to \$52.70; and for furnishing and installing grinders and water interlocks, from \$74.17 to \$100.50. The bid of \$74.17 for complete installation was accepted. The retail cost if bought by individual house owners would probably be double this. The city charges the home owners the bid price; where they wish, local banks advance them the money through a trust fund.

L. I. Couch and H. J. Kulin— "Municipal Garbage Disposal by Household Grinders at Jasper, Indiana;" Sewage and Industrial Wastes, September.

#### Designing Sewage Absorption Fields

About 17,000,000 persons in this country are served by the residential septic tanks-soil absorption system. Determination of the area required for the absorption system has been studied both theoretically and experimentally. The author concludes that this can be determined with reasonable accuracy t + 6.24

from the formula: C =-

in which C is the "percolation coefficient" (the sq. ft. of bottom trench area required for each gallon of settled sewage applied daily), and t is the maximum time required for water to fall 1" during percolation tests in saturated soil, in a hole 1 ft. square dug to the depth of the tile trenches. The percolation test should be continued until the percolation rate becomes constant—one engineer recommends not less than 6 hr., but in sandy soil probably 30 min. is sufficient.

John E. Kiker, Jr.—"Rational Design Criteria for Sewage Absorption Fields;" Sewage and Industrial Wastes, September.

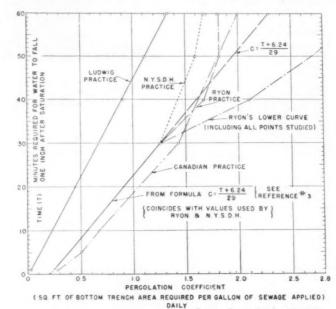
#### Disposal Of Cyanides

The author discusses the possibility of safe disposal of cyanide rinse waters by combining them with nickel-bearing rinses to form the tightly bound nickelocyanide complex, in which the concentration of free cyanide is maintained below the toxic range. The essential ingredients are commonly being wasted from most electroplating plants and require only the proper sequence of mixing to produce the desired results.

David Milne—"Disposal of Cyanides by Complexation;" Sewage and Industrial Wastes. September.

#### Refuse in Water-Filled Pits

Experiments are being conducted in England to determine the feasibility of disposing of refuse by dumping into old quarries, gravel pits, etc., that are full of water, which practice would ultimately fill the pit and reclaim the area for use. Ordinarily, if there is much putrescent matter present, hydrogen sulphide is formed rapidly. One method of avoiding this that is being tried, is to divide a pit into small



Courtesy Sewage & Industrial Wastes
 COMPARISON of different design data for soil loading.

lagoons with porous walls of clinker or broken stone, and fill each lagoon in succession so rapidly, that it is completely filled before nuisance develops; or, if hydrogen sulphide should occur, add acid to prevent further growth of sulphatereducing bacteria. Another idea being investigated is to introduce one of the several types of bacteria which consume sulphuretted hydrogen.

"Tipping Refuse into Water-Filled Pits at Twickenham"; Municipal Engineering, Sept. 1.

#### Asbestos-Cement Pipe Sewer System

The town of Macclenny, Fla., population 1200, has completed a system of sewers in which asbestoscement pipe was used throughout, including the house connections. The water table is high, and about 90% of the pipe was laid below it. As the town is practically level, grades were kept at a minimum, and it was believed that a low coefficient (n = 0.010) was warranted with this pipe, minimizing the depth of cuts and pumping lift. The pipe itself costs more than other materials, but it is estimated that this was more than compensated in savings due to shallow trenches, long pipe with few joints and these easily made, and greater ease of laying under difficult conditions. The sewers are practically water-tight; infiltration of the whole system did not exceed 4 gpm and this could be traced to the manholes.

Ed and Joe Williamson Jr.—"An Asbestos-Cement Pipe Sewer System Complete;" Water and Sewage Works, September.

#### Engines for Sludge Gas

The author discusses the selection of engines for operation on sewage sludge gas, whether they should be spark ignition or dualfuel; 2-cycle or 4-cycle; and should be supercharged or not. A lowcompression spark-ignition engine is cheaper per horsepower than a dual-fuel engine of corresponding rated horsepower and speed. If there is a surplus of gas, there is little advantage in a dual-fuel engine. But if there is a shortage of gas (more than about 10% deficiency), or if surplus power can be disposed of profitably, the dual-fuel engine has three advantages. 1-Almost instantaneous changeover to stand-by fuel. 2-More economical

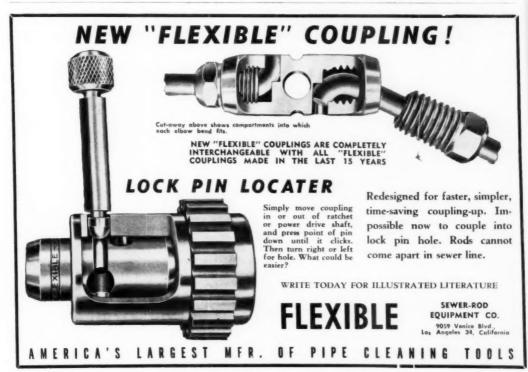
operation during periods of plant operation on stand-by fuel. 3—Ease of handling stand-by fuel. For borderline cases, the newly developed high - compression spark - ignition engines should be considered.

As to the choice between 2-cycle and 4-cycle, the author says both operate successfully and the choice should probably depend on cost and specific details, especially piston speed. As to supercharging, this gives lower cost per horsepower in large engines of more than 500 hp; permits more economical operation at part load; and increases the life of the engine.

Harold P. Hayes—"Considerations in the Selection of Engines for Operation on Sewage Sludge Gas;" Sewage and Industrial Wastes, September.

#### Preaerating Activated Sludge

The electrode potential of activated sludge and mixed liquor in aeration tanks indicates the extent to which sludge has been aerated. Preaerating activated sludge prior to mixing it with sewage enhances its ability to oxidize sewage. In experiments conducted, preaerated



sludge was capable of removing from 6.3 to 65.2% of the 5-day BOD of sewage; the amount depending on the length of the preaeration period and the condition of the sludge before aeration was started. Preaerating activated sludge in separate tanks before it is added to sewage or the inlet end of step aeration tanks may be more economical than mixing and aerating unaerated sludge and sewage in aeration tanks.

C. E. Keefer and Joseph Meisel—"Effect of Sludge Aid on Oxidizing Capacity;" Sewage and Industrial Wastes, September.

#### Survival of Tubercle Bacilli in Treatment Process

The removal of tubercle bacilli by sedimentation, chemical and coagulation, and sand filtration is of the same order as the removal of the organisms normally present in sewage. A free chlorine residual of 0.9 ppm was found necessary to reduce the number of tubercle bacilli from 118,000 per cc to less than 5 per cc. If removal of tubercle bacilli is taken as the criterion, a combination of chemical coagulation, sand filtration, and chlorination to a 1.0

ppm free chlorine residual would constitute efficient treatment and yield an effluent free of virulent tuberculosis organisms.

David Pramer and H. Heukelekian
—"The Survival of Tubercle Bacilli
in Sewage Treatment Processes;"
Sewage and Industrial Wastes, September.

#### Sewage Chlorination In the United States

A summary of statistics collected by the U.S. Public Health Service shows, among other data, that approximately 1300 plants, serving more than 18,000,000 persons, chlorinate sewage at some point in the treatment process. This is most common in the more populous states and in plants serving cities of over 10,000 population. In only 5 states and the District of Columbia are there no plants with chlorination facilities. In New York, New Jersey and Pennsylvania, 61% of the sewage treatment plants have chlorination facilities. Incomplete data indicate that the use of hypochlorite is confined to plants in 103 communities of less than 25,000 population. Comparative data for 1940, 1945 and 1948 indicate no general increase in the frequency of chlorination practice.

John R. Thoman — "Statistical Summary of Sewage Chlorination Practice in the United States;" Sewage and Industrial Wastes, September.

#### Sewer Service Charges in Delaware

As part of the "Incodel" program to minimize pollution of the Delaware river, Wilmington and New Castle Co. are planning to spend about \$13,000,000 for trunk sewers connected to a single treatment plant of 40 mgd capacity to be located in Wilmington. Of the total cost, \$8,400,000 will be spent in Wilmington, \$2,000,000 for interceptors and pumping stations in New Castle Co., and \$2,500,000 for trunk sewers in the county. It is proposed to pay this last item on the front foot assessment basis, and the other \$10,400,000 as sewer service charges. These charges will be based on water consumption, and will probably be about 50% of the water bill in the city. Several companies charging at different rates supply water in the county, and it has been suggested that a uniform rate be established to all customers of 10¢



Fig. 1—Model A2 KRANE KAR Swing Boom Mobile Crane . . . self-contained unit.

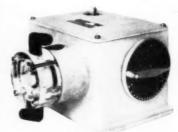
Fig. 2—Model Q2PX for mounting on standard motor truck, with or without dump body.

A FEW USERS: City of Scranton, Pa.; Township of Endicett, N. Y.; Kearny, N. J.; Freeport, L. I.; New York City. Bulletin No. 67 Tells the Story . . . Ask for It.

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per 1,000 gal. up to 300,000 gal. a quarter, with a minimum of \$3.00; the rate being reduced for larger amounts, to a minimum of 6¢ for over 9,000,000 gal. per quarter. This would make the county charges average less than 50% of the water bills.

Wilmington's share of the cost is about 5% of its assessed valuation, and if all this were raised by general-obligation bonds it might have an adverse effect on the interest rate of future bonds. It is suggested, therefore, that 50% or less of the issue be sold as revenue bonds. The county's \$2,000,000 share is only about 1½% of the assessed valuation and it is believed best to issue all of this as general-obligation bonds, for which lower interest rates would probably be obtainable.

A. R. Vollmer—"Sewer-Service Charges for City-County Sewerage Project"; American City, September.

### Depreciation Reserve In Kenosha, Wis.

With permission of the Wisconsin Public Service Comm., Kenosha's water department financed the construction of a sewage treatment plant, with the agreement that the plant be considered a "public utility." As such, State law requires it to provide a depreciation reserve account; for which purpose the budget includes an annual sum placed in reserve and calculated to pay for replacing worn out plant equipment and structures on the basis of original cost and after an estimated life. The reserve account approximates 19% of the total operating budgets. It is believed that such an account should be a part of the financial structure of any treatment plant.

Frank I. Vilen—"For That Rainy Day—A Depreciation Reserve;" Sewage and Industrial Wastes, September.

### Regulation of Industrial Wastes

The water works of Yonkers, N. Y., takes its supply from Saw Mill river. A chemical company about 3 mi. above the intake discharged about 2.2 mgd of wastes into the river; and on several occasions the effect was such that, even with slow sand filtration, the water could not be made palatable. By minor changes in the plant the waste discharged was reduced to 0.2 mgd, which was withheld from the stream.

Effects of other wastes such as damage to sewage pumps by pickling wastes, and odor and color caused by wastes from wool washing, were greatly reduced by changes at the offending plants. To minimize such troubles, the county (which operates the sewerage systems) adopted regulations requiring that industrial wastes discharged into the sewer contain no solids in solution which will precipitate greater than 1.000 ppm upon acidification (pH below 5.5), or alkalization (pH above 8.5) or oxidation or reduction. Viscosity of industrial wastes shall not exceed 1.10 upon discharge or after acidification, alkalization, etc. as outlined immediately above. The temperature upon discharge shall be within the limits of 32° and 150°F. The color shall not exceed an intensity of 500 ppm. The limiting chemical characteristics shall be: B.O.D., 400 ppm. chlorine demand, 25 ppm. suspended solids, 300 ppm., settleable solids, 10 ml/liter. pH, 4.5 to 9.5. A list is given of chemicals which are undesirable and shall not be discharged into the sewers unless reduced by treatment at the source to a concentration which will meet the general purposes of these regulations and will not adversely affect sludge



digestion or any other biochemical or biological process normal to sewage treatment plants.

James C. Harding-"Regulation of Industrial Wastes Entering Westchester County Sewers;" Sewage and Industrial Wastes, September.

### Effects of Industrial Wastes

To correct the effects of industrial wastes on sewerage systems, the author suggests the following: Require segregation of all clean water, with separate discharge, if possible. Require waste prevention measures in all industries such as blood, manure and grease collection in meat packing plants; screening of cannery waste; collection of offal, from fish canneries. No by-product or spoiled product dumping at milk plants. In case of a grit problem, require grit removal at the industry. Do not allow dumping of oil to the system. Require neutralization of acids and alkalies to pH 5.5 to 9.5. Do not allow the discharge of toxic materials such as metal ions, cyanides, phenols, etc. to the sewers in destructive or inhibiting amounts.

E. F. Eldridge-"Effects of Industrial Wastes on Municipal Sewage Works:" Sewage and Industrial Wastes, September.

### Dewatering Papermill Sludges

The concentration of pulp and paper mill waste sludges by mechanical dewatering has received considerable attention because of the immediate and pressing problem represented in disposal of the sludge. Extensive field testing was conducted at a variety of mills by use of rotary vacuum filtration, pressure filtration, and two-stage vacuum filtration. The last introduced the use of a relatively new device-a continuous vacuum tube thickener. In this, a number of tubes are immersed in the sludge and vacuum is applied to them until cake is formed on their exteriors. Then the cake is forced off by back pressure and is applied to a standard rotary filter.

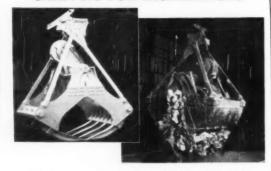
Results at integrated pulp and paper mills suggested that rotary vacuum filtration should be feasible for the great majority of these mills. At many other mills, and especially where alum coagulation is anticipated as a waste treatment measure, two alternative methods may be considered-pressure filtration and two-stage vacuum filtration. Pressure filtration offers the advantage of low initial cost. positive action, and a drier cake, with the disadvantage of higher operating costs. Two-stage vacuum filtration couples high initial cost with lower operating costs and concurs with the continuous flow principle of waste treatment.

Vaughn C. Behn-"Mechanical Dewatering of Papermill Sludges;" Water & Sewage Works, October.

### Sanitary Facilities In Subdivisions

The State Board of Health of Maryland has control over the installation of sanitary facilities for a subdivision where the developer plans to build houses on the project. Where only lots are sold, the Board may require the submission of comprehensive plans for water and sewerage systems, but not construction of them. Replies to a circular letter indicate that there are no states having laws which would require the developer of a subdivision to install water supply and sewerage facilities for undeveloped lots. Most states obtain control of such facilities through a cooperative arrangement with the Federal Housing Administration, the Veteran's Administration, State Real Estate Board, Regional Planning Commission, etc. Maine exercises consider-

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George L. Hall - "Controlling Water Supply and Sewerage in Subdivisions;" PUBLIC WORKS, October.

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An ordinance has been adopted by Waterloo, Iowa, which specifically restricts materials which may be discharged into the sewer system. These are prohibited:

Liquids having temperatures above 150°F:

Wastes containing more than 150 ppm of fat;

Inflammable or explosive liquids; Improperly shredded garbage;

Ashes, sand, metals, glass, rags,

Liquids having pH below 5.5 or above 9.0:

Toxic or poisonous substances; and

Suspended solids in liquid that will require additional attention or expense in treatment or maintenance.

Storm and surface water, roof runoff, cooling water and unpolluted industrial process water must be discharged into combined or storm sewers.

### **Painting Bridges**

(Continued from page 34)

### **Paint Specification**

The third fundamental in "Painting Economics" for bridge maintenance is the use of the right type of paint and primer for the job. All the preceding work will be largely wasted if the paint is not of the right type, embodying the necessary characteristics for heavy-duty service on bridges.

### **Primers**

No matter whether the bridge is to receive a full prime coat, or a spot coat, the same primer can be used. For many years red lead and linseed oil were the universal ingredients of primer paint. However during the war the widespread use of zinc chromate primers by the Navy has promoted the acceptance of this type of formulation.

However, modern paint technology recognizes the fact that no one pigment has all features that are desirable. As a result, the trend today is towards multiple-pigment types that now provide superior qualities in weathering, corrosion, resistance, waterproofing, etc.

One of the most dependable types of primer now available is a combination of red lead, iron oxide, and graphite. A break-down of the qualities of each of the above mentioned pigments reveals that the fact that red lead is an excellent pigment for corrosion resistance. Superior weathering characteristics are provided by the iron oxide, while the graphite, aside from complementing the foregoing pigments, also provides moisture repellency and ease of application. Iron oxide, by itself, gives good weathering resistance, but is short on corrosion resistance. Red lead, while withstanding corrosion, cannot take prolonged exposure to the elements. Of the various forms of graphite. experimentation has shown that flake graphite is better than any other types, due to laminated, heavier film

Another type of primer is composed of zinc chromate, iron oxide and graphite or other inert pigments. This has also proved satisfactory in certain instances.

The standard vehicle (liquid base) for many years has been linseed oil, either raw or boiled. When dry, it provides a film with good weathering characteristics, although not completely waterproof. Lately the development of synthetics, especially alkyds and phenolics, has resulted in a type of vehicle that is now the second most widely used. In the case of synthetics, numerous formulae are possible, but generally speaking they have a tendency to become too hard and brittle, leading to premature rupture of the film.

One of the most outstanding results of wartime research was the development of dehydrated castoroil as a paint and primer vehicle. This has now come to be recognized as the most waterproof of all paint oils. Combining dehydrated castoroil with linseed oil results in a vehicle that is both waterproof and weather resistant.

### Color

In certain types of paint formulations, the lighter colors are achieved at the expense of durability. Again borrowing a leaf from the railroad's book, over the years black paint has become standard. Utmost durability is demanded, rather than emphasis on fancy appearance.

However, aluminum and various of the darker shades of gray and green are also used on highway bridges with excellent results. Among the types of paints widely used for finish coats are aluminum, white lead, and graphite. These pigments are combined with many other pigments, and the formulations are endless. Generally speaking, graphite is the better "heavyduty" pigment. It is chemically inert, and unaffected by heat, cold, and the effects of rain and sun.

White lead has always been a good paint pigment, and has been used for years. It can be tinted to

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produce many excellent shades. Unfortunately, it is not chemically inert, but combines with certain gases, making it subject to discoloration. While this may not be too important in the relatively pure air in the country, it should be kept in mind when considering white lead for any bridge in an industrial area, where fumes and gases are likely to be encountered.

Aluminum makes a very good protective pigment. Its disadvantage is that it provides poor color stability. It has a fine brilliant appearance when fresh, but turns gray as it weathers. In many cases this is not objectionable, and it is used on many highway bridges all over the coun-

One point to keep in mind is the time element. If either spot or full priming has been done with a multiple pigmented primer, considerable time may be safely allowed to pass before application of the finish coats. In many cases as much as six months have elapsed, although this is not generally recommended. However, if a non-multiple primer has been used, especially red lead or zinc chromate, it is highly advisable to get the finishing coats on as fast as possible.

In summarizing the problems and procedures encountered in painting bridges, painting is the only way to prevent repairs from becoming necessary. In selecting the paint to be used, bear in mind the fact that it costs about \$4 in labor for every \$1 spent on paint, so that the importance of getting as many years as possible out of a paint job becomes obvious.

In line with this, no paint is any better than the surface on which it is applied. A paint manufacturer can use the finest materials, in a most modern plant, and supply you with a high quality product. Butif the surface hasn't been properly prepared, the results cannot be satisfactory. And—finally—don't try to "stretch" the life of the paint film. Doing this only results in a greater amount of work and repairs necessary to prepare the surface when the job is done-and that costs real money!

### New Diesel Engine for Burnips, Mich.

To supplement the power provided by three Model 60 Superior diesel engines, two of which are dual fuel units, Wolverine Electric Coop. has installed a new 8-cylinder Superior supercharged dual fuel diesel.

## PUBLIC

## EQUIPMENT

# News

### Add to the Bulldozer Family

A U-shaped bulldozer has been developed which permits long-haul pushing of loose material with mini-



The Caterpillar U-dozer.

mum end spillage when bulldozing straight ahead. It is excellent for stockpiling, felling trees, quick backfilling and smooth finishing. This new unit is cable controlled. It is designed for the Caterpillar D8 tractor. Full information from Caterpillar Tractor Co., Peoria, Ill., or by using the coupon.

Use coupon on page 85; circle No. 11-1

### Single Strap Pipe Connecting

Making lateral connections to branch and main lines of piping is simplified by this new single-strap clamp. By the use of molded rub-



Pipe connecting clamp.

ber and oil-resistant gaskets, a leak-proof seal is assured. Due to the wedging action of the resilient gasket, which develops partly from hydraulic pressure within the pipe, only moderate tightening of the strap nuts is necessary. Full data from Smith-Blair, Inc., South San Francisco, Calif., or by using the coupon.

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### Curb Paver Installs Monolithic Curb

Much hand labor can be eliminated by using a curb and gutter paver, with one end of the machine being supported on the side forms and the other end by an outrigger wheel which bridges the poured portion of the pavement. The outrigger can be extended up to 20 ft.



Paves, trowels and finishes.

6 ins. The curb paver will handle a variety of sections. On the job shown herewith, the curb was 5½ ins. high. The machine paves, trowels and finishes the curb and gutter in one pass at speeds of 5 to 10 ft. per minute. Information on this equipment, which should save money for every city, can be obtained from Dotmar Industries, Inc., Kalamazoo, Mich., or by using the coupon.

Use coupon on page 85; circle No. 11-3

The address of Central Construction Co. should be Indianola, lowa, instead of Indianola, Ind., as stated on page 98 of our September Issue.

### For Street, Alley and Other Sweeping

In this new heavy-duty sweeper, the operator's seat is placed on the front of the sweeper, giving him a



Attractive sweeper.

complete view of the sweeping area. This new model, which is powered with a 8-hp engine, is designed for sweeping streets, alleys, park lawns, etc., and for schools, hospitals and other institutions. A special device sucks up all dust; the equipment will sweep right up to any obstruction without scratching or marring. More data from Wilshire Power Sweeper Co., 4615 Alger St., Los Angeles 26, Calif., or by using the coupon.

Use coupon on page 85; circle No. 11-4

### Digger and Loader Combination

Tractor-powered and hydraulically operated, this handy unit digs, shovels and loads. It digs to a 7-ft. depth; backhoes by reversing the



A Pippin loader.

regular bucket; digs plumb trenches on sidehills up to 15° grades; elevates the bucket 10 ft. above grade; and swings on a 110° arc. Shovel bucket capacity is 5 cu. ft. It is provided as an attachment for Ford and Ferguson tractors. Fuller information from Pippin Construction Equipment, Inc., White River Junction, Vt., or by using coupon.

Use coupon on page 85; cricle No. 11-5

### Single Pass Portable Crushing Plant

Designed for city and county work this new plant has a mechanical feeder, a two-bearing vibrating screen 2 ft. by 3 ft., and may be equipped with a 1016, 1020 or 1024 roller bearing jaw crusher. A gathering conveyor blends the material from the screen and the crusher



Pioneer portable.

and can be used to load trucks or deliver to bin or stockpile. The plant is mounted on a 12-axle chassis with rubber tires. Data from Pioneer Engineering Works, Minneapolis, Minn., or by using the coupon.

Use coupon on page 85; circle No. 11-6

### Shovel-Crane with ½-yd. Capacity

Mounted on four sets of dual pneumatic tire's, this half-yard shovel crane travels at speeds to 15 mph, has full circle operation, and is convertible to all front end attachments. As a crane, it has a 10-ton lifting capacity with extend-



Wayne 1/2-yd. crane.

ed outriggers and auxiliary counterweight. A single engine, gasoline or diesel, supplies motive and operating power. It can travel, lift and swing at the same time. For job data and description, write Wayne Crane Div., American Steel Dredge Co., Inc., Fort Wayne, Ind., or use the coupon.

Use coupon on page 85; circle No. 11-7

### Transit-Maintenance Truck Body

Arranged to permit comfortable carrying of 4 men, this utility body should be of much value to water, sewerage and highway departments. Space is provided for carrying a wide variety of tools and materials. In addition, it is well-designed for surveying crews and for transporting extra tools and men to construction jobs. Trays, shelves and bins can be modified to meet any operational requirements. Full



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particulars from Powers-American Division, McCabe-Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo., or by using the coupon.

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### Floatless Utility Pump for Dewatering

This general utility pump is designed for quick and complete removal of water from trenches, pools,



Floatless pump.

basins, pits, flooded basements, etc. It operates completely submerged and is controlled by a liquid-level control, no float being required. The pump is light and compact and can be used in close quarters. Full data from Kenco, Inc., Lorain, Ohio, or by using the coupon.

Use coupon on page 85; circle No. 11-9

### Weight Chart for Reinforcing Bars

Made of stiff cardboard, this useful chart covers latest ASTM Spec. A-305 on reinforcing bars. It is handy size for binding in loose-leaf notebooks or hanging on the wall. Gives full data on bars from ¼" through 1¼", with listing by both the old system in inches and the new system by numbers. Sent on request to Concrete Reinforcing Steel Institute, 38 South Dearborn St., Chicago 3, Ill., or by using the coupon.

Use coupon on page 85; circle No. 11-10



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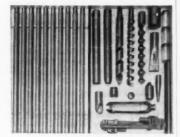
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### Deodorant for Sewerage and Garbage Work

A new deodorant is claimed to remove all sewage odor in sewers, cesspools, catchbasins, sewage disposal plants and garbage dumps. It is said to have insect repellent action and to be non-toxic to humans and to animals. Information on NOR 222 for sewerage work, 333 for garbage cans and garbage dumps and 444 for sewers can be obtained from Phillips Scientific Laboratories, 23-E Garden Terrace, North Arlington, N. J., or by using the coupon.

Use coupon on page 85; circle No. 11-12

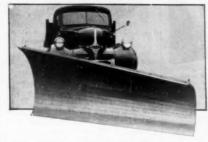
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Use coupon on page 85; circle No. 11-13

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Light Crawler Tractor

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### Power Shear for Brush Clearance

To trim trees with a minimum of effort and with a labor cost saving, a power shear has been developed which will cut 2-inch hardwood branches cleanly with one stroke. It is said to increase a man's production 3 or 4 times. Operation is by air pressure. The shear is available in lengths from 3 to 10 ft. and is made of lightweight aluminum alloy, with tempered steel jaws. Fuller information from J. T. Henry Mfg. Co., Hamden, Conn., or by using the coupon.

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### Handy Crane for City and County Work

This crane, which has a lift capacity of 5 tons, saves money on handling steel members and large



5-Ton Clyde Crane

timbers; for laying pipe and culverts; placing forms; and lifting hydrants and valves. Controls are hydraulic; turning radius is short. Additional data from Clyde Iron Works, Inc., Duluth 1, Minn., or by using the coupon.

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### Small Diesel Generating Set

Five new models of diesel-driven electric generating plants are now available in 12½ to 55 kw, in all standard voltages, frequencies and phases. The sets are powered by IHC low-speed engines which are started by a 12-volt starting system. Less than one minute is required for warming up before changing over to full diesel operation. A bat-



Small Diesel Generator

tery recharging generator is provided, and the units are equipped with automatic voltage regulators. Information is available from D. W. Onan & Sons, Inc., Minneapolis, Minn., or by using the coupon.

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### Small Power and Lighting Plant

A new stand-by electric power unit has a 2-cylinder air-cooled engine, and has a rated capacity of 5 kw. Other Katolight generators are available with speeds from 1,800 to 720 rpm, in capacities from 500 watts to 300 kw, and from 25 to 400 cycles. On this unit, not shown here, no batteries are needed, unless desired. Full information from Kato Engrg. Co., Mankato, Minn., or by using the coupon.

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### Light and Low-Cost 60 CFM Compressor

Any predetermined air pressure up to 100 pounds is automatically maintained in this unit. The tubular steel frame serves as the air receiver; balloon tires permit highspeed travel. Capacity is 60 cfm, weight 1,250 pounds. Suitable for light contracting, operation of air tools, sand blasting, spray painting and pavement breaking. Data from Davey Compressor Co., Kent, Ohio, or by using the coupon.

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### Rubber Pads for Crawlers

A process has been developed for vulcanizing resilient rubber to steel plates which, when bolted to crawler pads, permits pavers to move over finished concrete surfaces. It can also be applied to other crawler tractors. The B. F. Goodrich vulcalock bonding process is used, and the new process was announced by Metalweld, Inc., 26th and Hunting Park Ave., Philadelphia 28, Pa. For more data, write Metalweld, or use the coupon.

Use coupon on page 85; circle No. 11-22

### Water Works Training Course

The third in-service training course in water works problems will be given by the School of Public Health, University of Michigan, Ann Arbor, Mich., on Feb. 15 and 16, 1951. Information on the course can be obtained by writing the school.

### It's Now Clark & Groff

Col. Lloyd K. Clark has joined his brother, Warren, and Gilbert Groff, in Clark & Groff, consulting engineers, 3245 South Commercial St., Salem, Ore. Lloyd Clark, formerly state sanitary engineer of North Dakota, was one of the mainstays of the Sanitary Corps during World War II. After duty in headquarters Seventh Service Command. he was assigned to the Office of the Surgeon General, in Washington. At his own request, he was, in 1943, assigned to the Southwest Pacific as sanitary engineer, and accompanied the armies from New Guinea through the Philippines. His firm specializes in municipal and sanitary engineering and industrial waste treatment.

Mark M. Luckens, formerly a Major in the Sanitary Corps, announces the formation of Emmet Technical Associates, 1466 49th St., Brooklyn, N. Y., which will provide special laboratory facilities plus inspection and consulting services on environmental sanitation, industrial hygiene and waste analyses for consulting engineers and municipal officials.





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### INDEX OF ADVERTISEMENTS

Air Compressor Rental Co.	82	Homelit
Albright & Friel, Inc. All Purpose Spreader Co.	76	Hotpoin
All Purpose Spreader Co	67	Huber I
	17	Hydrau
Alvord, Burdick & Howson	76	Hydrau
Ayer-McCarel-Reagon Clay Co	27	
Roker Ir Michael	76	Infilco.
Baker, Jr., Michael Baldwin Lecomotive Works	53	Internat
Bannister Empirement Co	76	Internat
Barker & Wheeler	76	Irving !
Borowin Leconotive Works Bannister Engineering Co. Barker & Wheeler Barreth Div. The Black & Veatch Blow Knax Div. Bogert Assoc. (Clinton L. Bowe, Allbertson Assoc. Bowerston Shale Co. Bowerston Shale Co. Bowerston (nc.	29	-
Black & Venteh	76	Jaeger
Blow Knox Div	74	Johns A
Bogert Assoc. Clinton I	76	Jones,
Bowe, Albertson Assoc	76	
Bowerston Shale Co.	27	Kenned
Bowser, Inc. Brown Engineering Co.	28	Knowle
Brown Engineering Co.	76	Kilowia
Brown, Francis L.	76	Name of
Buck Saifart & Lors	76	Layne Lewis,
Builders Providence	75	Littlefor
Burgess & Niple	76	Lock Jo
Burgess & Niple Burns & McDonnell Eng. Co.	76	Lozier
		sould!
Caird, James M	76	
Caird, Jomes M. Calgon, Inc. Capitol Engineering Corp. Caterpillar Tractor Co. 14 & Chester Engineers Chicago Bridge & Iren Co. Chicago Fump Co. Clarke Gender & Assoc.	25	Mack 1 McDona
Capital Engineering Corp.	76	Metcali
Caterpillar Fractor Co	15	Motoro
Chester Engineers	77	M & H
Chicago Briage & Iron Co	21	Murdoc
Chicago Pump Co.	3	Muraoc
Clarke Gardner & Assoc.	77	
Cleveland Trencher Co. Cale & Son, Chas. W. Consoer, Townsend & Assoc.		Nation
Consect Townsend & Asset	77	Nation
Continental Steel Core	82	Nichols
Continental Steel Corp.	11	
Conveyor Co., The Corson, Oscar		Pacific
Corson, Ostar	77	Palmer
Darley & Co., W. S.	84	Petzold
Deleuw Cother & Co	77	Pfeifer
Demoster Brothers Inc	6	Pholps Pirnie
Dickey Clay Mfn Co W S	27	Pirnie
Dorr Co	24	Pitame
Delauw, Cather & Co. Dempster Brothers, Inc. Dickey Clay Mfg. Co., W. S. Dorr Co. Dow, A. W., Inc.	77	Pomon
Drott Kifg. Co	47	Precisio
	47	Pressur
Eagle Crusher Co	69	Proport
Fisher Research Lab., Inc. Flexible Sower-Rod Equpment Co.	84	Quinn
Flexible Sewer-Rod Egypment Co.	71	
Flink Co., The	56	Robert
Foote Co., Inc.	58	Roberts
Ford Meter Box Co.	62	Roots
Flink Co., The Foote Co., Inc. Ford Meter Box Co. Frink Sno-Plows, Inc.	59	Russell
Galion Iron Works & Mfg. Co.	2	Silent
Gonnett Fleming Cowlds. 2	-	Skinner
Carpenter, Inc.	77	Smith-E
Carpenter, Inc. General American Trans. Corp.	12	Smith
General Filter Co. Gilbert Associates Inc.	89	Stanley
Gilbert Associates Inc.	77	Stilson
Glodhill Road Mach. Co.	81	Superio
Globe Phone Mfg. Co.	89	
Gorman Rupp Co	68	Tarrant
Greeley & Hansen	77	Taylor,
Glibert Associates Inc. Gledhill Road Mach. Co. Globe Phone Mfg. Co. Gorman Rupp Co. Greeley & Hansen Green Co., Howard R.	77	Tennes
		Texas
Hauck Mfg. Co.	83	Tricklin
Marte Co Joke I	77	
Hagan Corp.	25	Wallac
Hellige, Inc.	90	Wertz
Heil Co.	73	Wolver
Hogan Corp. Hellige, Inc. Heil Co. Hill & Hill Hitchcack & Estabrook	77	Wood
Hitchcock & Estabrook	77	Worthi

Homelite Corp. Hotpoint, Inc. Huber Mfg. Co. Hydraulic Development Corp. Hydrauger Corp., Ltd.	30 51 9 58 74
Infilco, Inc. International Harvester Co. 46 & International Salt Co. Irving Subway Grating Co.	55 47 26 81
Jaeger Machine Co. Johns Manville Corp. 22 Jones, Henry & Schoonmaker	83 -23 77
Kennedy, Clyde C. Knowles, Inc., Morris	78 78
Layne & Bowler, Inc. Lewis, Harold M. Littleford Bros., Inc. Lock Joint Pipe Co. Lozier & Ce., Wm. S.	10 78 68 91 78
Mack Trucks Inc. McDonald Mfg. Co., A. Y. Mctolf & Eddy Motorolo, Inc. M. & H. Valve & Fittings Co. Murdock Mfg. & Supply Co.	8 16 78 60 54 90
National Clay Pipe Mfrs., Inc. National Fireproofing Carp. Nichols Engrg. & Research Corp.	19 27 87
Pacific Flush Tank Co. Palmer & Baker, Inc. Palmer & Baker, Inc. Pferifer & Schultz Pholys Inc., Boyd E. Pirnie Engineers, Malcom Pitometer Company Pamona Terra-Cotta Co. Pressure Concrete Co. Proportioneers, Inc.	84 78 80 78 78 78 78 27 72 84 64
Quinn Wire & Iron Works	80
Robert & Co. Roberts Filter Mfg. Co. Roots Connersville Blower Corp. Russell & Axon, Cons. Engrs.	77 86 18 78
Silent Heist & Crone Ca. Skinner Co., M. B. Smith-Bloir, Inc. Smith & Gillespie Stunley Engineering Ca. Stillson Assoc., Alden Superior Engine Division	72 86 65 78 78 78 4
Tarrant Mfg. Co. Taylor, Henry W. Tennessee Corp. Texas Virified Pipe Co. Trickling Filter Floor Institute	58 78 88 27 27
Wallace & Tiernan Co., Inc. Back Co Wertz & Assoc., Emerson D. Walverine Tube Division Wood Co., R. D Warthington Pump & Machinery Corp.	78 13 63 57

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Booklet	s from	n pag	es 85-	89:								
20	21	23		27	28	38	41	45	48	49	50	53
54	57	58	59	61	65	70	75	85	92	93	94	101
102	107	111	112	113	115	122	126	128	129	130	134	135
137	138	141	143	146	147	149	151	152	154	155	159	160
161	162		166	167	169	172	174	177	179	180	184	186
189	190	191	192	197	198	202	211	212	213	224	225	226
230	237	239	242	243	245	247	248					
New Pr	oduc	ts; Pa	ges 79	-83:								
11-1		1-2	11-3	1	1-4	11-5	11	-6	11-7	11	-8	11-9
11-10		-11	11-12	11.	13 1	11-14	11-	15	11-16	11-	17 1	11-18
11-19	11	-20	11-21	11-	22							
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230. Good advice on meeting the problem of snow lighting is offered in illustrated stories in "Caterpillar's" new 16-page booklet that shows how City, County and State highway departments and road commissions meet the challenge. Be sure you are ready to keep traffic moving. Use handly coupon, or write Caterpillar Tractor Co., Peoria 8, III.

### Full Line of Plows Meets All Snow Removal Needs

242. Data issued by the Gledhill Co. covers the 22 standard snow plows available to meet all snow removal needs. Safety trip, foldback hoist and interchangeability are featured. Write Gledhill Road Machinery Co., Galion, Ohio, or use coupon.

### POWER AND LIGHT

### Using Sewage Sludge Gas For Power Generation

27. A new Spage illustrated bulletin, No. 4811, describes Superior Dual Fuel Diesel engine operation and illustrates the simplicity of controls with fuel conversion by either push buttons or hand lever. Copies are available from Superior Engine Diw., Dept. PW, The National Supply Co., Tolecko, Olio.

### Air Cooled Engines for Hundreds of Applications

137. Tested under severest conditions of long, hard use, these engines have earned world wide recognition as the "right" power for hundreds of applications. Get latest bulletin from Dept. PW, Briggs and Stratton Corp., Milwaukee 1, Wisc.

#### Low Cost Power From Dual Fuel Engines

134. Operating on the Diesel cycle, burning either oil or gas, the Worthington Super-charged Dual Fuel Diesels give high economies by running on the cleapest fuel available. Get complete data from Worthington Pump & Machinery Corp., Dept. P.W. Harrison, N. I.

### SEWERAGE AND WASTE TREATMENT

### How You Can Dispose Of Sewage Solids

54. Nichols Herreshoff incinerator for complete disposal of sewage solids and industrial wastes—a new hooklet illustrates and explains how this Nichols incinerator works. Pictures recent installations. Write Dept. PW. Nichols Engineering and Research Corn. 70 Pine St. New York S, N. Y.

### Investigate This Machine For Sewer and Culvert Pipe

92. Machinery for making concrete pipe for sewers and culverts, both plain and reinforced, in sixes 4" to 36", is described in literature of the Concrete Pipe Machinery Co. Either bell and spiget or tongue and groove can be made. The soller head will pack a 4" wall solidly hetween two lines of steel fabric. Further details from Concrete Pipe Machinery Co., Sioux City 19, Iowa. Use the coupon.

### How to Improve Coagulation and Sludge Conditioning

111. "Ferri-Floc," description and instructions for use in coagulation, sludge conditioning and treating industrial wastes, fully treated in a 24-page pamphlet. Tennessee Corp., 619-27 Grant Bldg., Atlanta 1, Ga.

### Underdrains—Hidden But Important Filter Components

"Armere" vitrified salt glazed floor blocks which provide duets occupying 50% of the floor cross-section and air openings aggregating over 24% of the floor area. Described in several leaflets and data sheets. Ayer-McCarel-Reagan Clay Co., Brazil, Ind.

### Need Low-Cost Air For Sewage Treatment?

122. New 20-page booklet shows operating and construction features of Rotary Positive Blowers engineered to fit your needs. Air for activated sludge, water treatment constant vacuum for filtering. Bulletin 22-23-11-3 gives details. Roots-Connersville Blower Corp., 511 Poplar Ave., Connersville, Ind.

#### Durable Gratings and Treads Are a Good Investment

147. Gratings for walks around settling tanks and other parts of treatment plants, both out-doors and in, for stairways, floors and balconies, are described in an illustrated 16-page hulletin by Trving Subway Grating Co., 5053 27th St., Long Island City 1, N. Y.

### What You Should Know About Filter Underdrains

155. Specifications and construction details for the use of "Bosco" trickling filter floor underdrain blocks are available in literature published by Bowerston Shale Co., Bowerston, Ohio. Information on special fittings and angle blocks also included in 12-page booklet.

### Eight Advantages of Vacuum Sludge Dewatering

189. Efficient sewage treatment requires economical sludge disposal. Eight advantages of vacuum dewatering of sewage sludge are described in a new folder issued by the Eimco Corp., Salt Lake City 8, Utah. Use the coupon for your free copy.

### Conkey Filters for Sewage Sludge Disposal

180. Development of Conkey sludge filters and applications to all types of sewage sludge are described in Bulletin 100. Tables show filter sizes, weights, and give average anticipated results. Write General American Transportation Corp., Process Equip. Div., 10 East 49th St., New York 17, N. Y.

### Data on Design of Grit Collectors and Washers

202. Grit collection and separation of organic materials from settled grit is described in Link-Belt Bulletin 1942. Typical installations are shown, and design data is provided, together with specifications. Use coupon for copy, or write Link-Belt Co. 2045 W. Hunting Park Ave., Philadelphia 40, Pa.

### Book Tells How to Control Root Stoppages

211. Details on the proven use of copper sin severs are contained in a brand-new book published by Phelps Dodge Refining Co., 40 Wall St., New York S, N. Y.

#### Vacuum Filter Design Data

223. Typical flow diagrams, details of operation, power requirements and standard sizes of individual units and "package" units of the Oliver Sewage Sludge Dewaterer are presented in Bulletin 219. Check coupon for your copy. Oliver United Filters, Inc., 33 W. 42nd St., New York, N. Y.

### REFUSE COLLECTION AND DISPOSAL

### How the Mobil-Sweeper Can Improve Street Sweeping

23. Sweeping costs can be cut with the new Mubil-Sweeper which features safe highway speeds up to 55 mph, carries 2 /27 cu, yd, dirt hopper, sweeps swath up to 10° wide with full floating brooms. Hills and deep gutters are ne obstocle. Write to The Conveyor Co., 3260 E. Slauson Ave., Los Angeles 58, Calif. or use coupon for complete Jetails on this machine.

#### **Efficient Material Handling** to Reduce Incineration Costs

130. Blaw-Knox Buckets specially designed for refuse and garbage handling are described in 22-page Bulletin 2247. Illustrations show progress of material through a modern municipal incinerator plant. Dimensious and incinerator bucket specifications are included. Blaw-Knox Div., 2124 Farmers Bank Bldg., Pittsburgh 22, Pa.

### How to Build and Operate A Sanitary Fill

A Sanitary Fill

146. A complete discussion of many types
of sanitary fill construction, together with cost
data from communities of all sizes, is offered by
the Drott Mfg. Corp. Get this valuable presentation on the Drott Bullclam and International
Crawler tractor combination, specially designed
for all phases of sanitary fill work, by checking the handy coupon, or write Drott Mfg.
Corp., Milwaukee 8, Wis.

### Investigate This Plan For Garbage Elimination

164. A new presentation, written especially for municipal officials, offers a modern solution for the garbage disposal problem. Be sure you have this up-to-date information on the elimination of city garbage collection by the use of Hotpoint Disposall units. Check the coupon now. Hotnoint Disposall Department, 5600 West Taylor St. Chicago 44, Ill.

### City-Wide Planning for Dual Waste Disposal

243. You can get full details on the General Electric "Disposall" plan for garbage elimination by converting food wastes to sewage. Learn how Jasper, Ind., climinated garbage cans and collection nuisance with electrical disposal units by checking handy coupon. General Electric Co., Bridgeport 2, Conn.

### Sanivan Features Faster Refuse

Loading, Greater Capacity

245. The compression loading plate on the
Sirad Sanivan crushes ordinary loae refuse
into one-third original space. For clear cutaway views of this positive compression action
and mechanical full discharge, get the Sanivan
bulletin by using coupon. Sicard Industries,
Inc., 2055 Bennett Ave., Montreal 4, Canada.

### For Speedy, Nuisance-Free Refuse Collection

247. Refuse collection. The Gar Wood "Load Packer" compresses the refuse into the front of the collecting body, thus greatly increasing its capacity. Made in 9, 12 and 15-yd, capacities. Described in several bulletins of Gar Wood Industries, Inc., Wayne Div., Wayne, Mich.

### CONSTRUCTION EQUIPMENT

### How to Keep Trenching

row to Keep Trenching
Jobs on Schedulo
24. The easy maneuverability of the tough, compact Cleveland Model 95 "Baby Diager" makes it well suited for the difficult job of trenching past the many obstacles of effy crawler speeds handle all soil types and trench widths up to 24". Get Bulletin S-52 from Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.

### Shovel or Load With The Dempster Diggster

45. Automotive Hydra-Shovel digs 15 ft. above, 15 in. below grade, features independent hydraulic hoist and crowd action. Capacities 1 cu. yd. for digging solid earth, 11/4, 11/4 and

2 cu. yd. for loading all types material. Get information from Dempster Brothers, Inc., 949 Dempster Bldg., Knoxville 17, Tenn.

### Speed Your Work With These **Powerful Motor Graders**

48. Two powerful Galion motor graders designed to answer every requirement for more speed in road, airport, dam and housing construction work are fully described in a folder illustrated with many action pictures. Issued by Galion Iron Works & Mig. Co., Galion, Ohio.

### How to Keep Your Loader On the Job

50. Don't take more time to move your leader to the job than to do the work. Investigate the Eagle Truck Mounted Loader for handling gravel, sand, cinders, snow from windrows or piles. Get forms 444 and 947 from Eagle Crusher Co., Inc., Galion, Ohio.

### Data and Pictures of Complete Line of New Ford Trucks

38. Check this number on the coupon for colorful circular showing new Ford Trucks for every hauling need, available in great variety of standard, factory-built chassis and body com-binations. He sure to check these trucks on your job. Truck and Fleet Sales Dept., Ford Motor Co., Dearhorn, Mich.

### **Handy Catalog Covers** Complete Tractor and Grader Line

76. A new 20-page booklet in a liandy potential return a liandy produstrial tractor line. The importance of wise buying and fitting the equipment to the job is emphasized. Dun't miss your copy. Use coupon today. Allis-Chalmers Mfg. Co., Tractor Div., Box 512, Milwaulkee, Wis.

### Keep That Trench Pumped Really Dry!

93. To find out how well a Homelite Carryable Pump handles large volume, seepage, mud, write today for illustrated bulletin £503 containing data of great value to all pump unsers. Write Dept. PW, Homelite Corp., 2111 Riverdale Ave., Fort Chester, N. Y.



### Special Pumps to Fit Any Dewatering Job

101. Centrifugal Pumps. Long lasting, selfpriming, non-clogging pumps for quickly dewatering trenches and similar construction jobs. Ask for Bulletin 7-LW-13. Gorman-Rupp Co., 320 No. Bowman St., Mansheld, Obio.

### Mack Trucks for Every Road Building Job

184. An illustrated bulletin entitled "Mack Builds the Highways of the Fuxure" tells the story of Mack trucks on the heavy work of highway building and shows how Mack design meets the extra demands of this use. Copies available from Mack Mig. Copp., Empire State Building, New York J. N. Y.

### STREETS AND HIGHWAYS

### How to Save Time on Curb and Gutter Work

143. Every type of curb and gutter work is illustrated in the 12-page Heltzel catalog on steel forms for building concrete curbs, gutters and sidewalks. Time-saving setups show how to speed up the job and sawe money. Get your copy from Heltzel Steel Form & Iron Cs., Dept., PW, Warren, Ohio.

### Road Widening With Concrete, Bituminous Mix or Gravel

are handled quickly and accurately by Apsco Wideners. New illustrated bulletin shows operations on all types of widening strips, gives details on wideners and trench rollers. Issued by All Purpose Spreader Co., Elyria, Ohio.

### Versatile Maintainer Has Year 'Round Usefulness

151. A new bulletin shows how the sturdy Huber Maintainer will work for you the year round on maintenance jobs, berm leveling, road planing, bull-dozing, snow plowing, brooming, mowing shoulders and as a patch roller. Good ideas on how to do all these jobs in Bulletin No. M.138. Write Huber Manufacturing Co. Dept. PW. Marion, Ohio.

### How You Can Improve Your City's Street Cleaning

Your City's Street Cleaning

162. The Austin-Western Model 40
sweeper features three wheel design, front
wheel steer, for easy maneuvering; rear broom
to sweep dirt and refuse directly into 2-yd. hopper; built-in flushing device. Diagrams showing
all operations and full specifications in Bulletin
AD-2042, issued by Austin-Western Co., Aurora, III.

### Useful Data for Highway Builders In Barrett Road Book

190. The latest edition of "The Barrett Road Book" bas \$4 pages of helpful tables and step-by-step outlines of highway maintenance and construction with Tarvia and Tarvia-lithic. Tables show quantities per yard and mile. aggregate gradings; costs: many others. Get this useful book from Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.

### Here's How to Solve Your Drainage Problems

237. Sewers, culverts and other drainage structures required to withstand severe conditions must have structural strength and material durability to protect your investment. Be sure to investigate Armor Asbestos-Bonded Pipe when faced with corrosive wastes and soils: long spans or high loads. Use coupon to get Folder AB 3250 and see how Armor products can help you. Armor Drainage and Metal Products, Inc., Middletown, Ohio.

### WATER WORKS

### Cast Iron Pipe and Fittings For Every Need

65. Cast iron pipe and fittings for water, gas, sewer and industrial service. Super-deLavaud centrifugally-cast and pit-cast pipe. Bell-aud-supgot, U. S. Joint, flanged or flexible joints can be furnished to suit requirements. Vrite U. S. Pipe and Foundry Co., Dept. P.W. Burlington, N. J.

### What You Should Know About Hypochlorination

20. This really helpful booklet tells you a lot about hypochlorination of water for small and medium sized supplies, swimming pools and main sterilization, and fully describes the application of manual and automatic "Chem-C)-Feeders" for constant or proportional feeding of chemicals. Send for Bulletin SAN-8 issued by Proportioneers, Inc., Box 1342, Providence 1, R. I.

### Do Your Water Mains Need Cleaning?

38. Literature on Flexible method of cleaning water mains any size from 2" to 72", giving full details and list of nearest representatives in all parts of country. Address: Flexible Underground Pipe Cleaning Co., 9059 Venice Blvd., Los Angeles, Calif.

#### Eliminate Taste and Odor From Your Water

53. Technical pub. No. P.W. 213 issued by Wallace & Tiernan Co., Inc., Newark 1, N. J., describes in detail taste and odor control of water with Break-Point Chlorination. Sent free to any operator requesting it.

### Quick Way to Locate Leaks and Pipe

57. Leak Locators. Again available to waterworks superintendents, the Globe line of leak locators, dipping needles and pipe finders. Several leaflets describing the original Geophone leak locator. Little Wonder pipe phone, and the Magnetic Dipping Needle. Globe Phone Mfg. Corp., Dept. P., Reading, Mass.

#### Improved Clarification with Carter Circular Collectors

 Latest 16-page bulletin on water and sewage equipment, No. 4996, gives complete data and specifications on Carter's three different types of clarifiers. A valuable working guide for every sanitary engineer. Ralph B. Carter Co., Dept. PW, 188 Atlantic Ave., Hackensack, N. J.



### **Painting Water Tanks** For Longer Protection

94. High labor costs demand special consideration when painting elevated water tanks. This and other factors involved in proper paint selection are discussed in a bulletin issued by Jos. Dixon Crucible Co., Jersey City 3, N. J. Helpful specifications for repainting water tanks are also included.

### **Tested Jointing Materials**

\*\*D42. "Hydrotite" is a self-caulking, self-sealing joint compound for bell and spigot pipes. For data book and sample write Hydraulic Development Corp., 50 Church St., New York, N. Y.

### Specs for Gate Valves

112. Rigidly inspected gate valves for pressures up to 175 lbs. by R. D. Wood Co. Sizes 2" to 30"; for any standard type joint. R. D. Wood Co., Public Ledger Edg., Phila-

### Handy Catalog Describes Small Hydrants, Drinking Fountains

115. This 32-page catalog describes ¾" to 2" hydrants. Also street washers, drinking fountains and other water service devices. The Murdock Mfg. & Supply Co., 426 Plum Street, Cincinnati 2, Ohio.

#### Design Details on Flash Mixers and Flocculators

128. Descriptions of Dorr equipment for the basic steps of flash mixing and flocculation, sizes and design data for transverse flow flocculator, installation plans and sections are all included in Bulletin 6911. Write The Dorr Company, Barry Pl., Stamford, Conn., or use handy coupon.

### How Elevated Water Tanks Can Save on Operating Costs

134. Beautiful new booklet on Horton elevated steel water tanks suggests ways to reduce pumping costs, increase capacity of systems, maintain uniform pressure, etc. Illustrates 7 models of welded, ellipsoidal-bottom, elevated steel tanks in full color. Write Chicago Bridge & Iron Co., 2115 McCormick Bidge, Chicago 4.

### **Turbidity Measurements** Without Special Standards

141. The Hellige Turbidimeter is designed to avoid tedious suspension standards preparations and provide accuracy in the lower ranges by using the Tyndall Effect. Catalog 8000 shows exactly how this instrument operates and how it is used. Write Hellige, Inc., Dept. PW, 3718 Northern Bird., Long Island City, J. N. Y.

### The Modern Way to Filter Swimming Pool Water

129. That's the title of a bulletin full of facts about Bowsers' new diatomite filter to produce clear, sparkling, clean water at low cost. Occupies small space, doesn't waste water. Gives sizes to use, performance charts, etc. Write Bowser, Inc., Dept. PW, 1395 Creighton Ave., Ft. Wayne, Ind.

### **How Accurate Boring Speeds** Underground Pipe Installations

135. Interesting charts showing earth boring costs, speed and accuracy for holes from 2½" to 14½" diameter and up to 80 feet long are included in 16-page Catalog No. 8 issued by Hydrauger Corp., 681 Market St., San Francisco 5, Calif. Specifications and general operating instructions are also covered.

### Helpful Book Gives Pipe Flow

159. This handy 40-page pocket size book titled "Measurement of Water Flow Through Pipe Orifice with Free Discharge" explains the Layne pipe orifice meter method of computing water flow. Includes flow graphs for various size pipes. Layne & Bowler, Inc., Box 215, Hollywood Station, Memphis 8, Tenn.

### Easy Way to Locate Leaks In Underground Pipe

160. Fast and accurate leak detection pays didends in water savings and avoidance of needless digging. For data on the "Universal" Leak Locator write Leak Detector Co., 625 Hanna Bidg., Cleveland 15, Ohio.

### Fabrication with Everdur For Long-Range Economy

169. Corrosion-resistant Everdur alloys are assisted for dozens of applications in water and sewage plants. Many examples shown in Publication E-11 issued by The American Brass Co., Waterbury 20, Conn

### Locate Mains and Services Without Digging

186. A 16-page booklet tells how to use the Fisher "M-Scope" to locate buried pipes and valves by electronic means. Proper manipulation also determines depth of cover. Battery operated unit is readily carried by one man. Get data from Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.

### Installation Guide for Transite Pressure Pipe

192. A convenient, pocket-size book of 115 pages covers the whole job from receiving and handling pipe to pressure and leakage tests of finished lines. Over 100 drawings show important operations, and the text tells both bow and why. Copies are available from Johns-Manville, Dept. PW, 22 E. 40th St., New York 16, N. Y.

#### Two-Way FM Radio Telephone **Equipment for All Departments**

197. The benefits of two-way radio com-munication for all departments of municipalities and countries make full information on this subject important to all engineers. For descrip-tions of Motorola FM systems, or for specific recommendations concerning your application write to Dept. PW, Motorola, Inc., 4545 Augusta Blvd., Chicago St, Ill.

### Helpful Data on **Corporation Stops**

161. A complete line of brass goods for water works: corporation stops, curb stops, service pipe couplings, goosenecks and other fittings are illustrated and described in catalog W-59, issued by A. Y. McDonald Mfg. Co. Dubuque, Iowa. Get your copy for ready reference.

### What You Should Know About Meter Setting and Testing Equipment

164. Complete details on all equipment and proper methods for meter testing and installation are included in an excellent book pullished by Ford Meter Box Co., Wabash, Ind. All waterworks men concerned with setting and testing of water meters should have a copy or this book. Write for Catalog No. 50.

### Handy Catalog Covers All Pipe Repairs

167. A complete catalog covering repair clamps, packings and gaskets of several designs to suit all needs is offered by the Smith-Blair Co. Directions for use show ease of application. Every water works needs a copy of this catalog for ready reference. Available by using coupon or writing Smith-Blair, Inc., So. San Francisco, Calif.

### Does Your Water Works Have Standby Power?

224. Dependable Climax power plants are ready for emergency service to insure fire protection, and can also save power costs by peak load operation. Use the coupon for full data on Climax, 40 to 495 HP, operating on sewage or natural gas, butane or sasoline. Climax Eagine & Pomp Mfg. Co., Clinton, Iowa.

### Investigate This Compact Flow Meter for Water

226. The Foster "Flow Tube" is a new metering element that is compact and easy to install. Bulletin FT illustrates simple element containing nozzles for differential pressure production and shows capacity range and accuracy. Made 'n standard type sizes. Foster Engineering Co., Union, N. J. will send copy.

### **Automatic Pump Control** For Your Water System

239. In Bulletin 230-64. Builders-Providence outlines the "Pressureflo Control" system which is said to save on first cost by providing ground level storage in residential areas; permit unattended operation of outlying stations; furnish instantaneous response to meet fire flow. Plow diagrams and typical applications are included. Mail coupon to check this versatile system. Providence of the providence of

### USE THE GEOPHONE

### TO LOCATE LEAKS WITHOUT DIGGING!



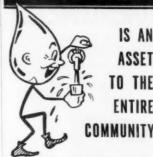
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## No Pollution WORTH TELLING .

- Pennsylvania Salt Manufacturing Company, Philadelphia, spent the week of September 25 justly celebrating its first hundred years. We regret the lack of space for reciting the record of this typical American Company. It makes inspiring reading.
- Beckman Instruments, Inc. the new corporate name of National Technical Laboratories, makers of Beckman pH meters and other well known water works instruments.
- Johnston Pump Company. Vernon, Calif., announces Kenneth G. Lundie as its new vice president, sales. Perry Brown is also a new vice president, engineering.
- · Like another famous man, we eat a mean dish of crow on occasion. Not running the picture (below) of President W. E. Robinson of National Clay Pipe Manufacturers Inc. along with the notice of his election is a previous oversight, hereby remedied.





Mr. Robinson

Mr. DuBois

- Above is F. W. (Duke) Du Bois whose new F. W. Du Bois Company, Detroit 21, will represent Walker Process Equipment, Simplex Valve and Meter, and Ball Valve companies. J. E. Cooper, long active in Michigan section A.W.W.A. and Michigan Sewage Works Association will be associated with him.
- · At the recent New England Water Works meeting in Poland Spring, Maine, Vice President Charles G. Richardson of Builders-Providence Inc. appeared in a new role to us—that of lecturer on "Humor Patented." If opportunity offers, don't miss it, particularly the last five slides illustrating it.
- Caterpillar Tractor Company announces promotions of J. R. Munro to director of manufacturing: C. A. Woodley succeeding him as general factory manager, with W. L. Naumann and Lloyd J. Ely as assistants.

### by Arthur K. Akers



- Kimball Blanchard, formerly with Crane Company, is the new sales engineer for Rensselaer Valve Company, New York district, vice James M. Robinson, resigned.
- Scott B. Ritchie became vice president in charge of operations, United States Pipe and Foundry Company, on October 1. He succeeds Richard K. Haughton, now in the new position of production consultant to Gen. Donald Armstrong, president of U.S.
- John R. (Jack, to you) Brockson has taken over sole ownership and control of Brokel Manufacturing Company, Newark, N. J. manufacturers of bituminous distributors, tank trucks of various kinds, flushers, etc.
- Sterling Electric Motors Inc., Los Angeles, has a new sales manager-Alan J. Bronold, coming from Westinghouse Electric Corporation. Boston.
- Activity at Atlas Mineral Products Company, Mertztown, Pa., continues unabated with announcement of Dr. Robert H. Steiner as research coordinator and Robert P. Desch, research chemist.
- Credit Jack Service of Sparling Meter Company with this one: They were giving him the third degree, but all the weary prisoner would say was, "Yes, dear! You are perfectly right!"
- With snow soon to fly, Sicard Industries Inc. send us this



Sicard Watertown plant.

picture of their Watertown, N. Y., plant where Sicard Rotary Snow Blowers and Sanivan refuse collecting equipment are turned out.



Lock Joint Pressure Pipe of any design may be tapped easily and economically for the purpose of establishing either large connections or small service outlets. With the aid of a few simple instructions, any experienced service crew can apply the modern tapping technique which permits the making of connections in concrete pressure pipe while the line continues to operate under pressure.

Although, for many years, taps have been made successfully in concrete pressure pipe, today's efficient equipment and modern methods now make it possible to tap Lock Joint Concrete Pressure Pipe with even greater economy of time, money and effort, and without sacrificing strength.

At your request we would be glad to send you our booklet outlining the simple steps required in making a pressure tap in Lock Joint Concrete Pressure Pipe. LARGE PHOTO: Tapping a 16" outlet in a 36" pipe at Wayne County, Michigan.

SMALL PHOTO: The pilot drill of the tapping machine withdraws the concrete core, making a clean cut, and leaving no obstruction within the pipe line.

Lock Joint Pipe Company for over forty years has specialized exclusively in the manufacture of reinforced concrete pipe for water supply and transmission mains as well as for severs, culverts and subaqueous installations.

### LOCK JOINT PIPE COMPANY

Est. 1905

P.O. Box 269, East Orange, N. J.
PRESSURE PIPE PLANTS: Wharton. N. J., Turner, Kan., Detroit, Mich.

BRANCH OFFICES: Casper. Wyo. • Cheyenne, Wyo. • Denver, Col. Kansas City. Mo. • Valley Park. Mo. • Chicago, Ill. • Rock Island, Ill. Wichita, Kan. • Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. Oklahoma City. Okla. • Tulsa, Okla.



### Columbus--

discovers

BREAK-POINT

Here's what Mr. George Lowe, General Manager of the 18 mgd Columbus, Georgia Water Works has to say about his experiences with Break-Point:

"... In 1944 when Break-Point was applied at our plant, we promptly received several advantages. We increased filter runs, obtained better coagulation, and eliminated nur troubles with slime and algoe..."



Columbus, Ga. Water Works where chlorination by Wallace & Tiernan is on the job

S-51

Such results are typical with the Break-Point Process and dependable W&T Equipment. In the case of the Columbus Water Works, four W&T Master Chlorinators handle pre- and post-chlorination and ensure an average *free residual* of between 0.4 and 0.6 ppm in practically all parts of the distribution system.

W&T Equipment is the first choice of thousands of progressive water works across the country because every unit is precision built with custom care to give long trouble-free service. Such equipment, backed by over 35 years of leadership in chlorination, and coupled

with the facilities of a nationwide service staff, insures dependable, proven results.

Find out today how the Break-Point Process —especially when coupled with W&T Residual Chlorine Recorders — can help you. Your nearest W&T Representative will be glad to give you all the necessary information.

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